UNIONE EUROPEA
Fondo Sociale Europeo
Ministero dell'Università e della Ricerca
PON RICERCA E INNOVAZIONE
REACT EU

La borsa di dottorato è stata cofinanziata con risorse del
Programma Operativo Nazionale Ricerca e Innovazione 2014-2020, risorse FSE REACT-EU
Azione IV.4 "Dottorati e contratti di ricerca su tematiche dell'innovazione"
e Azione IV.5 "Dottorati su tematiche Green"

UNIVERSITA' DEGLI STUDI "G. d'Annunzio"
Chieti-Pescara

SCUOLA SUPERIORE "G. d'Annunzio"

DOTTORATO DI RICERCA IN
Accounting, Management and Business Economics

CICLO
XXXVII

LUXURY FASHION: TRADITION EXPANDS ITS HORIZONS TOWARD SUSTAINABILITY AND DIGITAL INNOVATION

Dipartimento di Economia Aziendale
Settore Scientifico Disciplinare SECS-P/07

Dottoranda
Dott.ssa Martina Mattioli

Coordinatore
Prof.ssa Federica Ceci

Tutor
Prof. Antonio D'Andreamatteo

Anni Accademici 2022/2025

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION 1

CHAPTER I 7

MAPPING THE EVOLUTION OF LUXURY FASHION RESEARCH: A BIBLIOMETRIC ANALYSIS TO IDENTIFY TRENDS AND THEMATIC CLUSTERS 7

1. Introduction 7
2. Theoretical Background 9
3. Methodology 10
   - 3.1 Data Collection 11
   - 3.2 Data refinement and keyword standardisation 12
   - 3.3 Data analysis and visualisation of results 12
4. Conclusion 19
   - 4.1 Limitations and Future Research 21

CHAPTER II 23

SUSTAINABLE DIGITAL TRANSFORMATION: A CASE STUDY IN THE LUXURY FASHION INDUSTRY 23

1. Introduction 23
2. Theoretical Background 25
   - 2.1 Industry 4.0 25
   - 2.2 Digital transformation 26
   - 2.3 Fashion Industry 27
3. Methodology 29
   - 3.1 The case study unit 29
   - 3.2 Data collection 30
4. Findings 31
   - 4.1 Digital transformation of production processes and adaptation of systems 31
   - 4.2 Enablers and barriers involved in digital transformation 32
5. Discussion and conclusion 35
   - 5.1 Limitations, future studies, and managerial implications 37

CHAPTER III 40

DECODING SUSTAINABILITY: A TEXT MINING ANALYSIS OF LUXURY FASHION INDUSTRY REPORTS 40

1. Introduction 40
2. Theoretical Background 42
   - 2.1 Sustainability in the Fashion Industry 42
   - 2.2 Control Systems and Sustainability Reporting 43

2.3 Emerging Technologies in the Luxury Fashion Industry 44
3. Methodology.....45
4. Findings and discussion.....46
5. Conclusion.....51
CHAPTER IV 54
THE SUSTAINABLE FASHION DILEMMA: EXPLORING WHAT INFLUENCES CONSUMER DECISIONS IN A DIGITAL AGE THROUGH SURVEY-BASED INSIGHTS.....54
1. Introduction 55
2. Theoretical Background 56
2.1 Fashion Industry Segments.....56
2.2 Emerging technologies in Fashion.....58
2.3 Sustainability in Fashion 60
3. Methodology.....60
3.1 Survey design 61
3.2 Hypotheses development.....63
3.3 Data analysis and visualisation.....65
4. Empirical Findings 65
4.1 Sample Demographics.....65
4.2 Descriptive Statistics 67
4.3 Inferential Statistics 75
4.3.1 Chi-Square Analysis.....75
4.3.2 Multiple Linear Regression Analysis 83
4.3.3 Analysis of Variance (ANOVA) 85
5. Discussion.....86
5.1 Consumer Priorities: Affordability, Sustainability and the Paradox of Intention.....87
5.2 Omnichannel Strategies, Convenience, and Flexibility.....87
5.3 Technological Perceptions: Blockchain's Potential and Limits 88
5.4 Demographic Nuances: Income, Generational Divides, and Ethical Trade-Offs 89
5.5 Social Media Engagement vs. Influence 89
6. Conclusion.....90
6.1 Theoretical and Practical Implications 91
6.2 Future Research Directions.....92
CONCLUSIONS.....94
REFERENCES.....101
Appendix 1.....121

LIST OF TABLES

INTRODUCTION 1

Table 1. Dissertation chapter overview 3

CHAPTER I 7

MAPPING THE EVOLUTION OF LUXURY FASHION RESEARCH: A BIBLIOMETRIC ANALYSIS TO IDENTIFY TRENDS AND THEMATIC CLUSTERS 7

Table 1. Refined set of keywords 12

Table 2. 15 most cited papers 14

CHAPTER II 23

SUSTAINABLE DIGITAL TRANSFORMATION: A CASE STUDY IN THE LUXURY FASHION INDUSTRY 23

Table 1. Enablers and Barriers of Digital Transformation 34

CHAPTER III 40

DECODING SUSTAINABILITY: A TEXT MINING ANALYSIS OF LUXURY FASHION INDUSTRY REPORTS 40

CHAPTER IV 54

THE SUSTAINABLE FASHION DILEMMA: EXPLORING WHAT INFLUENCES CONSUMER DECISIONS IN A DIGITAL AGE THROUGH SURVEY-BASED INSIGHTS 54

Table 1. Influencing factors in shopping experience. 69

Table 2. Affordability vs Style 70

Table 3. Blockchain level of Awareness and Understanding. 72

Table 4. Fashion brands' blockchain adoption – purchase intention 73

Table 5. Fashion brands' blockchain adoption – shopping experience satisfaction. 74

CONCLUSIONS 94

Table 1. Summary of Chapter Findings and Theoretical Contributions 95

LIST OF FIGURES

INTRODUCTION 1

CHAPTER I 7

MAPPING THE EVOLUTION OF LUXURY FASHION RESEARCH: A BIBLIOMETRIC ANALYSIS TO IDENTIFY TRENDS AND THEMATIC CLUSTERS 7

Figure 1. Research protocol 11

Figure 2. Annual Scientific Production and Citations 13

Figure 3. 10 Most Relevant Sources 13

Figure 4. Thematic Map 16

Figure 5. Authors' keyword co-occurrence 18

CHAPTER II 23

SUSTAINABLE DIGITAL TRANSFORMATION: A CASE STUDY IN THE LUXURY FASHION INDUSTRY 23

CHAPTER III 40

DECODING SUSTAINABILITY: A TEXT MINING ANALYSIS OF LUXURY FASHION INDUSTRY REPORTS 40

Figure 1. KNIME Workflow 46

Figure 2. Main Topics Wordcloud 47

CHAPTER IV 54

THE SUSTAINABLE FASHION DILEMMA: EXPLORING WHAT INFLUENCES CONSUMER DECISIONS IN A DIGITAL AGE THROUGH SURVEY-BASED INSIGHTS 54

Figure 1. Sample gender distribution 66

Figure 2. Sample age distribution 66

Figure 3. Sample employment status distribution 67

Figure 4. Sample annual income distribution 67

Figure 5. Fashion category preferences over the last six months 68

Figure 6. Number of fashion items bought in the last six months 68

Figure 7. Fashion item retention period 69

Figure 8. Preferred channel for purchasing fashion items 71

Figure 9. Percentage of respondents following fashion brands on social media 71

Figure 10. Impact of social media advertisements on fashion purchases 72

Figure 11. Gender-based distribution of fashion shopping preferences 76

Figure 12. Age-based distribution of shopping preferences 77

Figure 13. Distribution of shopping preferences across annual income levels 77

Figure 14. Distribution of shopping preferences across employment status 78

Figure 15. Distribution of fashion items bought across shopping preferences 79

Figure 16. Association between item retention duration and shopping preference 79

Figure 17. Association between item retention duration and age group.....80
Figure 18. Association between item retention duration and gender.....81
Figure 19. Association between item retention duration and employment status 82
Figure 20. Association between item retention duration and annual income 83
Figure 21. Predictors of purchase intent: coefficients and confidence intervals 85
Figure 22. Shopping experience aspects based on estimated marginal means 86
CONCLUSIONS 94
Figure 1. Multilevel framework for tradition–innovation tensions in the luxury fashion industry 97

INTRODUCTION

In today's digital era, the luxury fashion industry faces unprecedented pressure to integrate emerging technologies to maintain its competitive edge. Digital transformation has emerged as a strategic imperative. So much so that brands are innovating and rethinking their interactions with consumers, supply chains, and business ecosystems as a whole (Kraus et al., 2022; Nambisan et al., 2019). Among the various enablers of this transformation, technologies such as digital platforms and ecosystems contribute to the creation of collaborative networks that extend beyond traditional competitive boundaries, subtly reshaping established business models (Autio et al., 2018; Jacobides et al., 2018). Furthermore, emerging technologies, such as blockchain, present unique opportunities for luxury fashion brands, enhancing supply chain transparency, combating counterfeits, and bolstering consumer trust (Amed et al., 2021).

This dissertation aims to understand the role that the adoption of emerging technologies plays in the luxury fashion industry and how specific technologies (e.g., blockchain technology) influence consumers' relationships and shopping experiences. Furthermore, it also looks at the sustainability aspect since the luxury fashion industry has always been at the centre of controversies regarding its ties with the environment.

Through four interrelated studies, this research aims to offer insights into how digital transformation appears to influence business models and consumer behaviour within the luxury fashion industry, thereby contributing to a broader understanding of digital innovation in luxury and fashion contexts (Tapscott & Tapscott, 2017).

The first chapter maps the academic literature on the luxury fashion industry through a bibliometric analysis. By examining 560 papers, it aims to identify the thematic evolution and key research trends within the field. Through keyword co-occurrence mapping and thematic analysis, this chapter seeks to contextualise the academic discourse surrounding the industry, including digital transformation, sustainability, and emerging technologies. In this regard, it lays a foundation for the empirical studies that follow and identifies gaps for future research.

The second chapter focuses on a single case study of a luxury fashion SME to analyse how the digital transformation process influenced the company's organisational structure, production process, and adoption of emerging technologies. It aims to identify the factors that enable and/or hinder this transformation in an

SME. Hence, the second chapter places attention on a small reality in the industry being studied. A full paper was presented at the Italian Chapter of the Association for Information Systems (ItAIS) in 2023.

The third chapter involves a text-mining analysis of sustainability reports from four luxury fashion brands, identifying predominant standards and best practices. This chapter focuses on analysing sustainability strategies within the industry, particularly examining their alignment with management control systems (MCSs) to provide insight into how sustainability practices integrate with operational management.

In this context, the chapter highlights the pivotal role of management accounting in facilitating this alignment. By employing tools such as performance measurement systems, sustainability accounting, and cost management frameworks, management accounting provides the necessary infrastructure to monitor, evaluate, and enhance the effectiveness of sustainability initiatives. Furthermore, it examines how management accounting practices enable luxury fashion brands to translate sustainability goals into actionable strategies, ensuring that environmental and social objectives are seamlessly integrated into everyday operational and financial decision-making processes. A short paper was accepted for discussion at the XIII Workshop of The Management Control Journal held at the SIDREA National Conference 2024.

In contrast to previous chapters, the final chapter shifts its focus toward consumers in the luxury fashion industry. Specifically, it examines how fashion brands' adoption of blockchain technology influences consumer behaviour. Drawing on survey data from 383 consumers, this study investigates how blockchain's potential to enhance transparency, authenticity, and trust impacts and shapes consumer perceptions.

Together, these studies aim to provide a multidimensional perspective on the evolving impact of digital technologies in the luxury fashion sector, addressing both organisational dynamics and consumer interactions. By exploring the integration of emerging technologies like blockchain and assessing their potential implications for transparency, sustainability, and consumer trust, this dissertation seeks to contribute to the understanding of digital innovation in luxury contexts.

Table 1 provides a detailed overview of the dissertation. While the four chapters adopt distinct theoretical and methodological lenses – spanning academic discourse, organisational practices, and consumer behaviour – they are unified by their exploration of digitalisation and sustainability in the luxury fashion industry. As outlined in Table 1, this multi-level approach begins with a macro-level analysis in Chapter 1, which maps the evolution of the academic discourse on luxury fashion, revealing a noticeable shift toward themes of

digitalisation (e.g., blockchain, AI) and sustainability (Choi, 2019; Zollo et al., 2020). At the meso-level, Chapters 2 and 3 investigate how firms navigate these dual imperatives. Chapter 2 examines SME responsiveness through Dyloan Bond Factory's integration of Industry 4.0 technologies like 3D prototyping, while Chapter 3 analyses luxury fashion holdings' sustainability reporting and their underuse of emerging technologies to align strategic disclosures with actionable metrics (Gazzola et al., 2024). Finally, Chapter 4 adopts a micro-level focus, analysing how the adoption of technologies, such as blockchain, reshapes consumer trust, engagement and overall decision making, despite persistent gaps between sustainability values and purchasing behavior (Carrington et al., 2014).

This stratified structure mirrors the interconnected dynamics of the luxury fashion industry. By synthesising macro trends (e.g., regulatory frameworks like the EU CSRD), meso challenges (e.g., SME-conglomerate contrasts in technological adoption), and micro complexities (e.g., the attitude-behaviour gap), the dissertation constructs a multi-actor framework. This model, revisited in the conclusion section, tries to offer actionable insights for firms balancing heritage with accountability and for consumers navigating ethical consumption. Together, these layers provide a holistic understanding of how digital transformation redefines luxury fashion's competitive advantage, sustainability commitments, and consumer relationship.

Table 1. Dissertation chapter overview

Chapter	***Research aim and focus***	***Research Questions***	***Key References***	***Literature Stream***
Chapter 1: Mapping the Evolution of Luxury Fashion Research	Uses bibliometric analysis to identify key themes, trends, and research gaps in luxury fashion literature from 1999 to 2024.	- How has the focus of luxury fashion research evolved over time? - Which thematic clusters dominate the literature?	Kapferer & Bastien (2012); Choi (2019); Zollo et al. (2020); Gurzki & Woisetschläger (2017)	Luxury branding, sustainability, and digital innovation perspectives; bibliometric methods as a tool to contextualise academic debates.
Chapter 2: Digital Transformation in a Luxury SME	Explores how the Dyloan Bond Factory, as an SME in the luxury sector, adapts through digital transformation via technologies such	- What enabling factors influence the digital transformation of an SME in the fashion industry? - What barriers characterize its implementation?	Bertola & Teunissen (2018); Cabigiosu (2020); Morakanyane et al. (2017); Gong & Ribiere (2021)	Digital transformation, Industry 4.0, and organisational change; focus on SME innovation and adaptation.

	as 3D printing and blockchain.			
Chapter 3: Sustainability Reporting and Control Systems	Analyses sustainability reports via text mining to examine how luxury brands integrate sustainability strategies with management control systems (MCSs).	- How do luxury brands align sustainability strategies with MCSs? - What role do technologies play in this integration?	Karaosman et al. (2015); Marchi & Paolini (2020); Niinimäki et al. (2020); Gazzola et al. (2024)	Sustainability accounting and CSR debates, management control systems, and the symbolic versus substantive dimensions of sustainability reporting.
Chapter 4: Blockchain and Consumer Trust	Investigates consumer responses to blockchain-enabled transparency in luxury fashion, focusing on the attitude-behavior gap in ethical consumption.	- How does blockchain adoption influence consumer trust and purchasing behavior? - How does it affect perceptions of sustainability?	Carrington et al. (2014); Zhang & Kim (2013); Turunen et al. (2020); Park et al. (2018)	Ethical consumer behavior and digital trust; perspectives from consumer decision-making, technology adoption, and the tension between ethical and pragmatic consumption.

Nonetheless, several limitations should be acknowledged, including the focus on a limited number of case studies and survey participants, which may affect the broader applicability of the findings.

Despite these limitations, the research aspires to offer both theoretical and practical contributions. On a theoretical level, it addresses specific gaps in the literature, particularly concerning the influence of blockchain technology on consumer trust and sustainability practices in luxury fashion. These insights may serve as a starting point for further research to explore these themes in diverse contexts. On a practical level, the findings provide considerations for industry stakeholders as they explore ways to implement digital technologies to improve supply chain transparency, foster consumer trust, and support sustainability goals.

Additionally, the research underscores the critical role of management accounting in operationalizing these contributions. By leveraging tools such as sustainability accounting, cost analysis frameworks, and performance measurement systems, management accounting facilitates the effective alignment of digital transformation and sustainability strategies with organisational goals. This perspective highlights the potential for management accounting to act as a bridge between strategic objectives and practical implementation,

offering industry stakeholders actionable insights for improving accountability, resource allocation, and decision-making processes.

By addressing gaps in the literature, particularly regarding blockchain's role in shaping consumer perceptions and sustainability approaches, this dissertation contributes to ongoing academic discourse and offers insights that may inform real-world practices. In doing so, it highlights some of the strategic and ethical considerations that could guide future developments in the digital landscape of the luxury fashion industry.

CHAPTER I

Mapping the Evolution of Luxury Fashion Research: a Bibliometric Analysis to Identify Trends and Thematic Clusters

Abstract. This research examines 560 papers from 1999 to 2024 through a bibliometric approach to identify the development of ideas and key themes surrounding the discourse about the luxury fashion industry.

The Scopus database and tools such as Bibliometrix and VOSviewer were used to analyse trends and connections between keywords. In addition to revealing publication and citation trends, a thematic map and a co-occurrence network were created. In detail, six clusters emerged: (1) consumer-centric branding and counterfeiting, (2) digital/social media engagement, (3) generational motivations, (4) brand loyalty, (5) sustainability/CSR, and (6) technological innovation.

Research has evolved from traditional branding (1999–2010) to digital transformation (2010–2019) and sustainability (2020 onward). Motor themes like brand loyalty coexist with emerging critiques (anti-consumerism) and niche topics (e-service quality).

This study offers an overview of luxury fashion research, emphasising shifts toward digitalisation and ethics while identifying understudied areas like blockchain integration and Generation Z's redefinition of the concept of luxury. Finally, luxury brands should balance heritage with digital flexibility and adaptability, prioritise authentic sustainability over greenwashing practices, and address the differences in values across generations.

Keywords: luxury fashion industry, bibliometric analysis, digitalisation, sustainability

1. Introduction

The luxury fashion industry has long been synonymous with craftsmanship, exclusivity, and tradition. Rooted in Veblen's (1899) definition of conspicuous consumption—stating that luxury goods signal social status—this sector has thrived on scarcity and aspirational branding since its beginning (Kapferer & Bastien, 2012). Nevertheless, as the industry navigates today's challenges, namely climate accountability, digital disruption, and ethical consumerism, the academic discourse surrounding it has evolved dramatically.

This paper consists of a bibliometric analysis of 560 academic articles published between 1999 and 2024. It aims to map the intellectual landscape of luxury fashion research to identify trends, thematic clusters, and emerging patterns.

While the luxury industry's environmental footprint is smaller in scale compared to fast fashion – responsible for 8–10% of global carbon emissions (Niinimäki et al., 2020) – it still relies on resource-intensive materials (e.g., leather, exotic textiles) and energy-heavy artisanal practices (Achabou & Dekhili, 2013; Fletcher, 2014). [even though, there is some effort made to find alternatives to these with more sustainable raw material and practices]Recent research emphasises luxury's potential to lead sustainability efforts leveraging circular economy models (Bocken et al., 2016) and regenerative supply chains (McDonough & Braungart, 2002). Although, critics argue that progress is hampered by greenwashing and tokenistic [pro forma, superficial, symbolic, performative] eco-collections (Lyon & Montgomery, 2015).

Concomitantly, digital innovations such as AI-driven personalisation, NFTs, and blockchain are reshaping luxury's core principles (). The rise of phygital experiences, which blend physical and digital engagement, has enabled brands to experiment with virtual fashion shows and metaverse storefronts (Guzzetti et al., 2024). These advancements align with Hennigs et al.'s (2012) assertion that luxury must balance tradition with technological relevance. However, scholars caution that digital innovations, particularly in social media engagement, NFTs, and alternative ownership models like renting, can pose risks of brand dilution by reducing psychological distance and exclusivity (Park et al., 2018; Vogel et al., 2018; Basile et al., 2024).

Consumer behaviour, which can be viewed as a cornerstone of luxury research, has also shifted. In fact, early studies focused on status signalling (Vigneron & Johnson, 2004) and hedonic consumption (Hirschman & Holbrook, 1982). More recent research highlights generational divides, with Millennials and Gen Z demanding greater transparency, inclusivity, and digital engagement, particularly through social media and sustainability initiatives, while older cohorts continue to prioritize heritage, craftsmanship, and exclusivity (Turunen et al., 2020; Burnasheva, Suh, & Villalobos-Moron, 2019; Dobre et al., 2021). Growing consumer awareness of ethical issues in fashion has driven resistance to traditional luxury consumption. Criticism of labour exploitation, environmental harm, and corporate elitism fuels anti-consumption movements, pushing brands toward greater transparency and sustainability (Yoon et al., 2020; Cavusoglu & Dakhli, 2016).

As fashion research continues to evolve, prior studies have extensively examined the rise of fast fashion and its disruptive impact on the industry (Bhardwaj & Fairhurst, 2010). In contrast, research on luxury fashion has focused on key aspects such as branding strategies (Choi, 2014; Ko et al., 2017), social media influence (Creevey et al., 2021), and sustainability-related dimensions (Vanacker et al., 2022; Yang et al., 2017). Existing bibliometric reviews have either taken a broad approach to luxury research, encompassing industries beyond fashion—such as hospitality, automobiles, and fine art (Gurzki & Woisetschläger, 2017; Rathi et al., 2022)—or have focused on specific aspects of luxury fashion, such as durability and sustainability (Vanacker et al., 2022 Addressing this gap, this study aims to provide an analysis of the academic literature surrounding the luxury fashion industry as a whole and to answer the following two research questions:

RQ1. How has the focus of luxury fashion research evolved from 1999 to 2024?

RQ2. Which thematic clusters dominate the literature?

The chapter's structure is as follows. The next section presents a brief overview of the existing literature on the luxury fashion industry. Section 3 outlines the research methodology, which is divided into three subsections: data collection, data refinement, and data analysis. The findings of the bibliometric study are divided into two subsections: descriptive and co-word analyses. Section 4 concludes the chapter by encapsulating the work, articulating findings, acknowledging limitations, and proposing recommendations for further research.

2. Theoretical background

The concept of luxury has long been associated with wealth, social status, and symbolic consumption (Heine, 2010). Today, luxury fashion encompasses high-end apparel, accessories, and lifestyle products that serve both functional and expressive purposes (Kapferer & Michaut-Denizeau, 2020). Limited production and limited distribution enhance the perceived value of luxury products, which signify social status and distinction (Moore et al., 2010; Kapferer, 2020). High-quality materials and thorough production procedures (i.e., craftsmanship) boost brand prestige and authenticity, often promoting consumer attachment (Brun et al., 2008; Wu, 2015). Furthermore, many luxury brands emphasize their historical legacy - brand heritage and brand identity - and cultural significance, playing a crucial role in differentiation and consumer loyalty (Fionda & Moore, 2009).

Hence, the motivations for purchasing luxury fashion extend beyond functionality and encompass social and psychological dimensions. Luxury fashion conveys not only social status but also self-expression and emotional value, making it an important part of identity formation across different cultural contexts (Venkatesh et al., 2010; Bruno & Barki, 2014). In addition, the interplay between counterfeits and authentic luxury goods reflects consumer attitudes toward materialism and status, as well as the ethical considerations of purchasing behaviour (Yoo & Lee, 2009).

Over time, luxury fashion has spread globally to emerging markets such as China and Brazil (Cabigiosu, 2020). Younger generations, such as millennials and Generation Z, and digital platforms have further reshaped the industry and demand (Bruno & Barki, 2014). Considered in conflict, luxury and sustainability are converging, with brands adopting ethical sourcing and responsible production (Kapferer & Michaut-Denizeau, 2020). The durability of luxury products aligns with sustainability, challenging the notion of inherent waste (Bruno & Barki, 2014), mostly associated with fast fashion.

Counterfeiting remains a major challenge for this industry. Some consumers see replicas as access to authentic luxury, while others see them as substitutes (Yoo & Lee, 2009). To protect exclusivity, brands employ anti-counterfeiting technologies (Heine, 2010). For this reason, supply chain management plays a crucial role in balancing exclusivity and efficiency. Flagship stores reinforce brand identity (Moore et al., 2010), while omnichannel retailing integrates online and offline experiences (Cabigiosu, 2020). Sustainability is also shaping supply chains through ethical labour practices and responsible sourcing (Kapferer & Michaut-Denizeau, 2020).

The industry is evolving due to digital innovation, changing consumer preferences, and regulatory changes. Artificial intelligence, blockchain, and augmented reality are revolutionising retail and authentication (Cabigiosu, 2020). Personalisation and customisation are gaining traction, and there is a growing demand for tailored products (Heine, 2010). In addition, regulatory pressures and consumer activism are pushing brands to prioritise transparency and environmental responsibility (Kapferer & Michaut-Denizeau, 2020).

3. Methodology

Given the size of the dataset analysed, bibliometric analysis was chosen to answer the research questions. This approach, which uses a set of methods to study or measure texts and information in large datasets, provides a

systematic, transparent, and reproducible data review procedure based on statistical measurement. In this research, the bibliometric approach was chosen primarily to identify research themes and trends over time, thus focusing on the conceptual aspect of the analysis.

Academics commonly identify two primary methods for bibliometric analysis: performance analysis and scientific mapping. These methods adhere to a research protocol or, as Zupic and Čater propose, follow a standardised workflow.

A combination of the techniques described in the paper will be used to answer the research questions. Figure 1 illustrates the steps followed in the analysis stages: data collection, data refinement, standardisation and homogenisation of collected keywords, data analysis and visualisation, and interpretation of results.

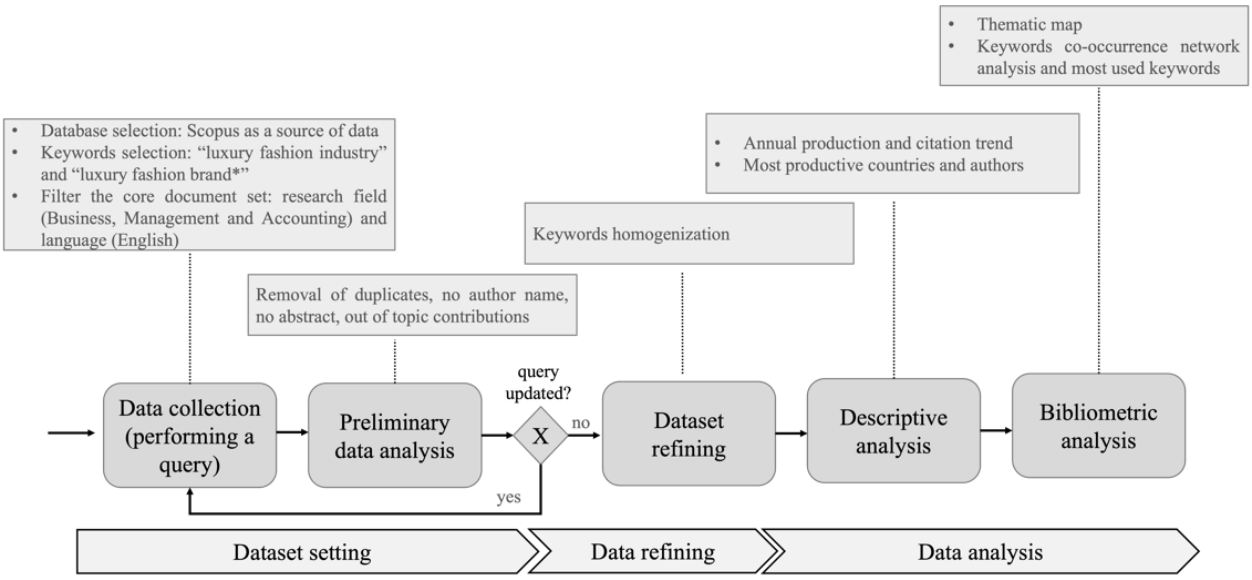


Figure 1. Research protocol (adapted from Za and Braccini, 2017)

3.1 Data collection

To conduct this analysis, the Scopus database was used, which is considered one of the most comprehensive for interdisciplinary academic contributions and one of the most widely used in academic research. Furthermore, the analysis was conducted using the R package Bibliometrix, Excel and VOSviewer. First, a search of the Scopus database for the following research query was performed:

(TITLE-ABS-KEY ("luxury") AND TITLE-ABS-KEY ("fashion" OR "fashion industry" OR "fashion brand*")) AND PUBYEAR > 1991 AND PUBYEAR < 2025 AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (LANGUAGE , "English"))

Where applicable, terms were searched in their singular and plural forms, with an asterisk in titles, abstracts, and keywords. The search resulted in 759 articles published between 1991 and 2025. As shown in the research query, the search was narrowed down, limiting the area to 'Business, Management, and Accounting' and considering only contributions written in English and at the final stage of publication.

3.2 Data refinement and keyword standardisation

Prior to data processing, the dataset included 199 papers with missing authors, no abstract, and missing author keywords. The final sample, which covers the period from 1999 to 2024, consists of 560 academic papers.

A further step, essential for the identification of the conceptual structure, is the homogenisation of the authors' keywords, done within the R package Bibliometrix. In order to reduce bias, keywords that occurred the most in the articles were preferred over those that occurred the least, while words with the same meaning were grouped together and loaded as synonyms. Some examples of standardisation are given in Table 1. In detail, spelling errors were eliminated, the singular form of terms was preferred to the plural form and vice versa, and keywords were preferred in their British English version.

Table 1. Refined set of keywords

Original authors' keywords	Revised keywords
AI Artificial Intelligence	Artificial Intelligence
Blockchain Blockchain technology	Blockchain
Digitalization Digitalisation	Digitalisation
Consumer behaviour Consumer behavior	Consumer behaviour
Counterfeiting Counterfeits Counterfeit	Counterfeiting
Customer experience Consumer experience	Customer experience

3.3 Data analysis and visualisation of results

Descriptive analysis. As shown by Figure 2, the academic interest in the luxury fashion industry began in 1999 and, over the last decade, has observed a steady and growing trend. The peak in publications in 2020 can be attributed to the disruption caused by COVID-19 not only in manufacturing sectors but also in society, as

well as technological advances such as specific technologies (blockchain, artificial intelligence, augmented reality) and environmental issues and, consequently, sustainability as a whole.

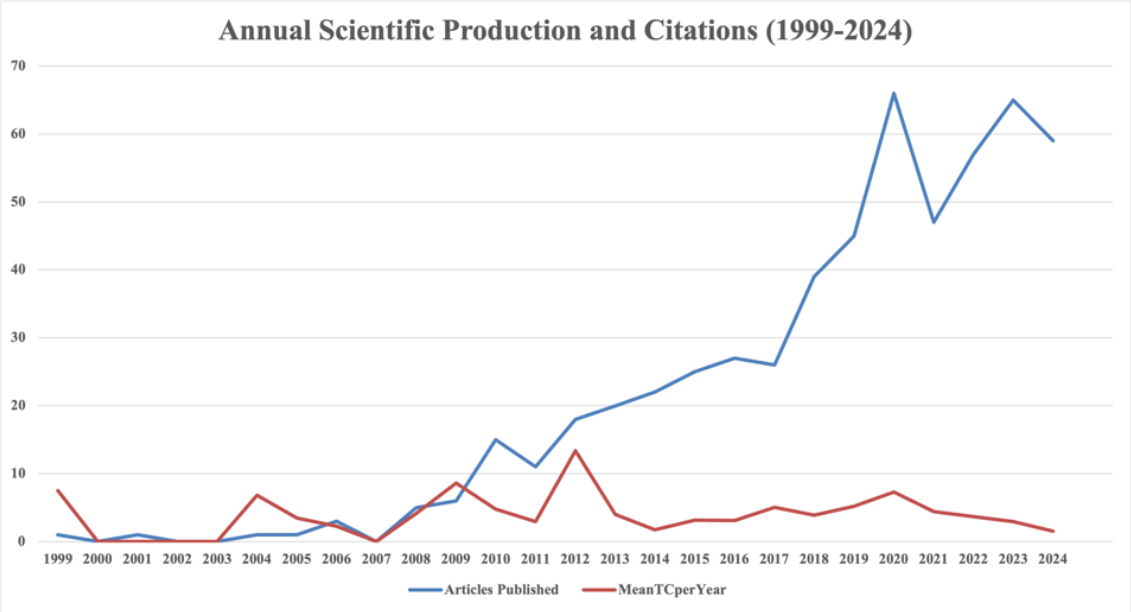


Figure 2. Annual Scientific Production and Citations on the Luxury Fashion Industry

In contrast to the steady growth in publication volume, the average total number of citations per year shows a more variable trend, characterised by peaks in 2012 and 2020 and periodic declines.

While the growing number of publications reflects a vibrant and active research community, the variability in citation patterns suggests that not all contributions achieve a comparable level of influence.

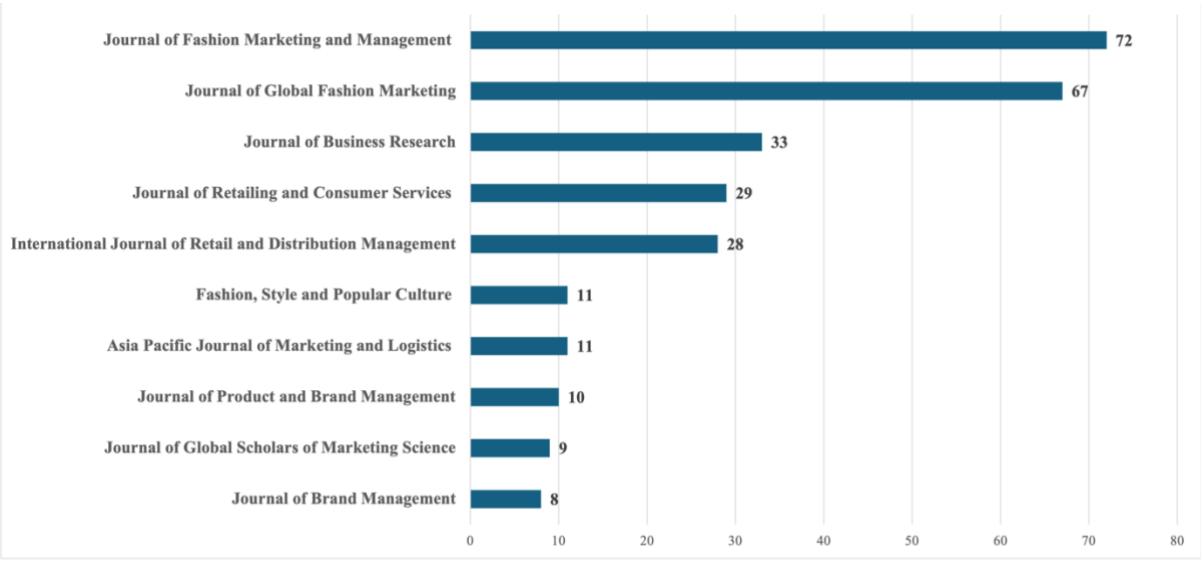


Figure 3. 10 Most Relevant Sources

As Figure 3 shows, the Journal of Fashion Marketing and Management emerges as the leading publication, with 72 papers underscoring its centrality in shaping the discourse within this field. It is closely followed by the Journal of Global Fashion Marketing, with 67 articles, reflecting its focus on international aspects of fashion marketing. Other journals, such as the Journal of Business Research (33 articles), the Journal of Retailing and Consumer Services (29 articles), and the International Journal of Retail and Distribution Management (28 articles), show substantial contributions to the field, offering interdisciplinary perspectives and insights into aspects such as consumer behaviour, retail management, and business strategies.

In addition, the inclusion of journals such as Fashion, Style and Popular Culture and Asia Pacific Journal of Marketing and Logistics (11 articles each) highlights the growing interest in niche topics such as cultural influences on fashion and logistics considerations in the Asia Pacific region. Similarly, the Journal of Product and Brand Management (10 articles) and the Journal of Brand Management (8 articles) emphasise the role of branding strategies in the luxury fashion industry.

Table 2. 15 Most Cited Papers

Article	Number of Citations
Kim, A. J., & Ko, E. (2012). Do social media marketing activities enhance customer equity? An empirical study of luxury fashion brand. Journal of Business Research, 65(10), 1480-1486. https://doi.org/10.1016/j.jbusres.2011.10.014	**1.393**
Chung, M., Ko, E., Joung, H., & Kim, S. J. (2020). Chatbot e-service and customer satisfaction regarding luxury brands. Journal of Business Research, 117, 587-595. https://doi.org/10.1016/j.jbusres.2018.10.004	**532**
Choi, T.-M. (2019). Blockchain-technology-supported platforms for diamond authentication and certification in luxury supply chains. Transportation Research Part E: Logistics and Transportation Review, 128, 17-29. https://doi.org/10.1016/j.tre.2019.05.011	**445**
Kim, A. J., & Ko, E. (2010). Impacts of luxury fashion brand's social media marketing on customer relationship and purchase intention. Journal of Global Fashion Marketing, 1(3), 164-171. https://doi.org/10.1080/20932685.2010.10593068	**433**
Kapferer, J.-N., & Bastien, V. (2009). The specificity of luxury management: Turning marketing upside down. Journal of Brand Management, 16(5-6), 311-322. https://doi.org/10.1057/bm.2008.51	**414**
Fionda, A. M., & Moore, C. M. (2009). The anatomy of the luxury fashion brand. Journal of Brand Management, 16(5-6), 347-363. https://doi.org/10.1057/bm.2008.45	**354**
Liu, F., Li, J., Mizerski, D., & Soh, H. (2012). Self-congruity, brand attitude, and brand loyalty: A study on luxury brands. European Journal of Marketing, 46(7/8), 922-937. https://doi.org/10.1108/03090561211230098	**298**
Li, G., Li, G., & Kambele, Z. (2012). Luxury fashion brand consumers in China: Perceived value, fashion lifestyle, and willingness to pay. Journal of Business Research, 65(10), 1516-1522. https://doi.org/10.1016/j.jbusres.2011.10.019	**276**

Zhang, B., & Kim, J.-H. (2013). Luxury fashion consumption in China: Factors affecting attitude and purchase intent. Journal of Retailing and Consumer Services, 20(1), 68-79. https://doi.org/10.1016/j.jretconser.2012.10.007	**262**
Cervellon, M.-C., Carey, L., & Harms, T. (2012). Something old, something used: Determinants of women's purchase of vintage fashion vs second-hand fashion. International Journal of Retail and Distribution Management, 40(12), 956-974. https://doi.org/10.1108/09590551211274946	**223**
Zollo, L., Filieri, R., Rialti, R., & Yoon, S. (2020). Unpacking the relationship between social media marketing and brand equity: The mediating role of consumers' benefits and experience. Journal of Business Research, 117, 256-267. https://doi.org/10.1016/j.jbusres.2020.05.001	**214**
Djelic, M.-L., & Ainamo, A. (1999). The coevolution of new organizational forms in the fashion industry: A historical and comparative study of France, Italy, and the United States. Organization Science, 10(5), 622-637. https://doi.org/10.1287/orsc.10.5.622	**203**
Kapferer, J.-N. (2012). Abundant rarity: The key to luxury growth. Business Horizons, 55(5), 453-462. https://doi.org/10.1016/j.bushor.2012.04.002	**199**
Park, H.-J., Rabolt, N. J., & Sook, K. J. (2008). Purchasing global luxury brands among young Korean consumers. Journal of Fashion Marketing and Management, 12(2), 244-259. https://doi.org/10.1108/13612020810874917	**185**
Wiedmann, K.-P., & von Mettenheim, W. (2020). Attractiveness, trustworthiness and expertise – Social influencers' winning formula? Journal of Product and Brand Management, 29(7), 927-939. https://doi.org/10.1108/JPBM-06-2019-2442	**181**

Table 2 presents the 15 most cited articles within the analysed dataset. The most cited article, Kim and Ko (2012), with 1,393 citations, underscores the substantial impact of social media marketing on enhancing customer equity for luxury fashion brands.

Other highly cited articles in this area include Kim and Ko (2010) (433 citations) and Zollo et al. (2020) (214 citations), which further emphasise the importance of digital marketing strategies in driving consumer engagement and brand equity. Wiedmann and von Mettenheim (2020) (181 citations) analyse the success factors of social influencers in luxury marketing, such as trustworthiness and attractiveness, reflecting the importance of influencer marketing in improving brand image and purchase intention.

In contrast, Choi (2019), with 445 citations, explores the role of blockchain technology in authenticating and certifying diamonds in luxury supply chains, highlighting the increasing integration of technologies to ensure transparency, authenticity, and ethical sourcing, which are critical to maintaining consumer trust.

In this regard, Liu et al. (2012) (298 citations) and Zhang and Kim (2013) (262 citations) delve into consumer behaviour, focusing on brand loyalty, self-congruence and purchase intention. They highlight the psychological and cultural factors that influence luxury consumption, particularly in emerging markets such as China. In addition, Park et al. (2008) (185 citations) provide insights into the preferences of young Korean consumers, emphasising the role of social recognition and materialism in driving their purchase decisions.

Shifting the focus back to the luxury fashion industry, Kapferer and Bastien (2009) (414 citations) and Fionda and Moore (2009) (354 citations) focus on the unique aspects of luxury brand management, examining how exclusivity, storytelling, and craftsmanship differentiate luxury brands from mass market competitors. Kapferer (2012) (199 citations) introduces the concept of "abundant rarity," discussing how luxury brands maintain their prestige while expanding globally, reflecting on the paradox of rarity and accessibility.

In contrast, Cervellon et al. (2012) (223 citations) highlight the growing interest in sustainable fashion through vintage and second-hand consumption. This aligns with growing consumer demand for eco-friendly and ethical luxury products. Finally, Djelic and Ainamo (1999) (203 citations) offer a historical and comparative analysis of the co-evolution of organisational forms in the fashion industry, emphasising the industry's adaptation strategies in response to environmental changes.

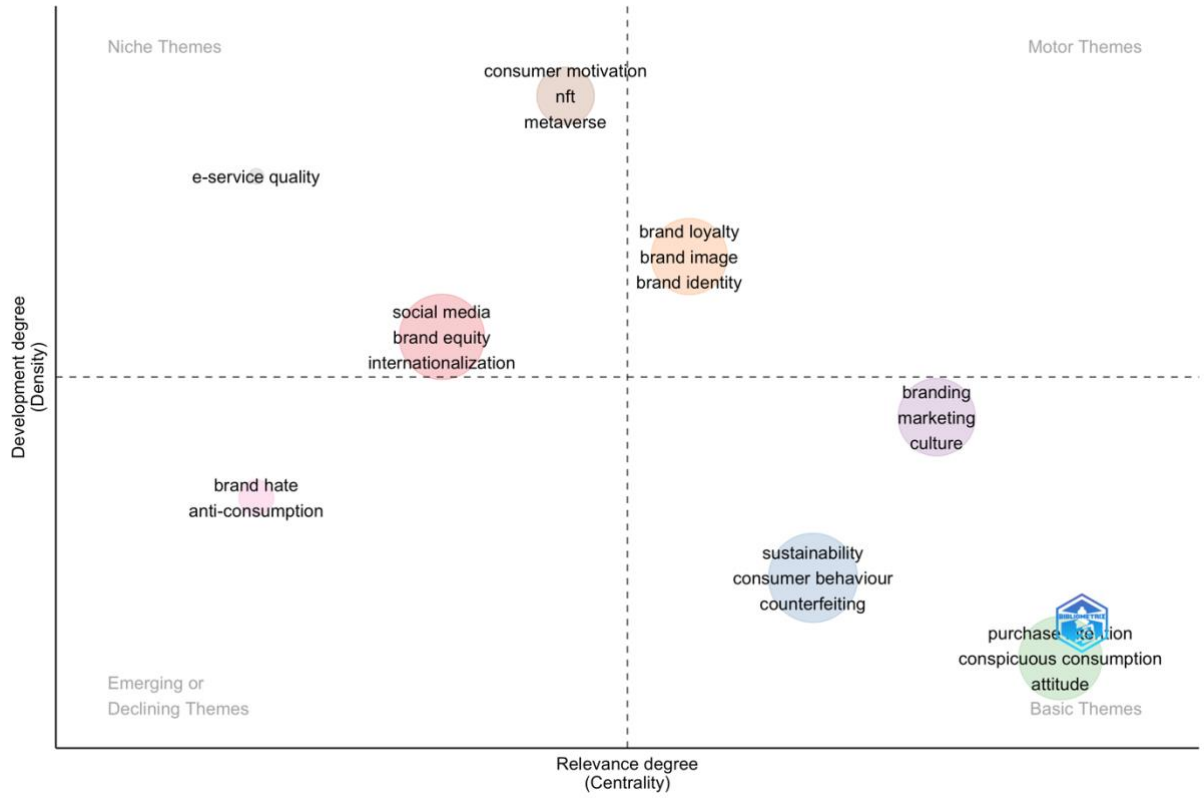


Figure 4. Thematic Map - 8 clusters

The thematic map, shown in Figure 4, highlights the varying degrees of relevance (centrality) and development (density) of different topics. These themes are categorised into four quadrants: motor themes, basic themes, niche themes, and emerging or declining themes.

Motor themes (high centrality and high density) such as brand loyalty, brand image and brand identity represent well-developed and central areas in luxury fashion research.

The importance of brand loyalty reflects its role in sustaining long-term relationships between consumers and brands. Studies such as Liu et al. (2012) focus on the psychological mechanisms underlying brand loyalty, particularly in emerging markets such as China, where self-congruence and cultural factors play a significant role. Furthermore, Kim and Ko (2010) highlight the impact of social media marketing on promoting brand loyalty and improving consumer engagement with luxury brands.

The basic themes (high centrality and low density) include sustainability, consumer behaviour, counterfeiting, and overconsumption.

Sustainability has emerged as a critical concern, with studies such as Cervellon et al. (2012) delving into consumers' growing preference for eco-friendly practices, including the purchase of vintage and second-hand luxury items. Similarly, Choi (2019) explores the role of blockchain in tackling counterfeiting and improving transparency in luxury supply chains, offering a technological perspective to address this persistent problem.

Conspicuous consumption, often linked to the luxury fashion market, is linked to studies such as Zhang and Kim's (2013), which analyse how social recognition and materialism influence purchase intentions. These themes emphasise the complex interplay between consumer motivations and ethical considerations in shaping luxury consumption.

Topics such as e-service quality represent highly specialised but less central research areas - niche themes (low centrality and high density). These topics are well developed within their domain but lack broad applicability to the luxury fashion discourse. For example, Chung et al. (2020) examine the role of chatbots in improving customer satisfaction in luxury e-commerce, highlighting the importance of digital innovation in improving service quality. The social media and brand equity cluster overlaps with Kim and Ko's (2012) analysis of the impact of social media marketing on customer equity, highlighting its role as a transient but vital area.

Themes such as brand hatred and anti-consumerism occupy the emerging or declining themes quadrant, reflecting areas of low centrality and low density. These themes may represent nascent research areas or declining interest in traditional narratives of luxury consumption. For example, anti-consumerism could be in

line with growing consumer criticism of unsustainable practices in the luxury sector, as highlighted in Cervellon et al.'s (2012) exploration of sustainable alternatives.

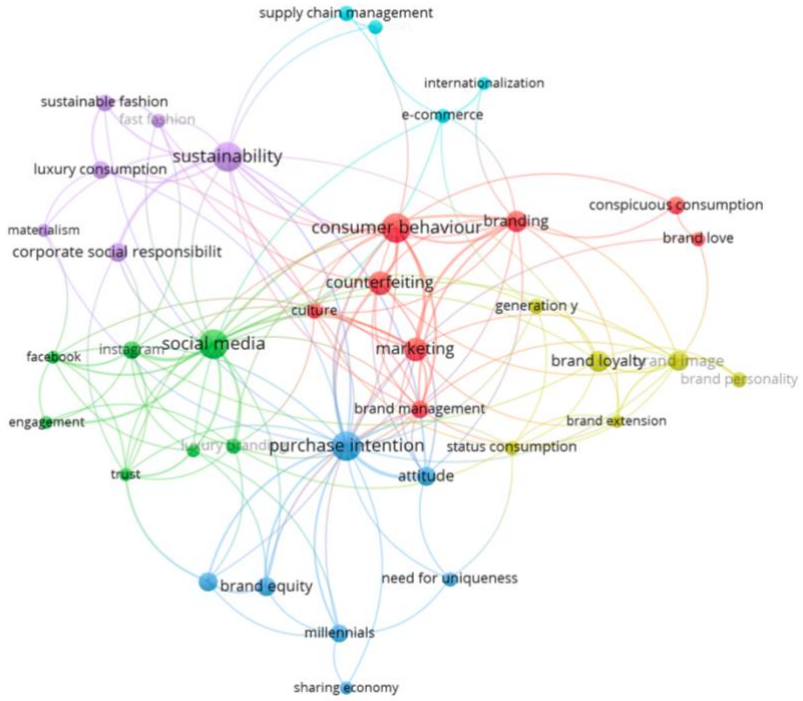


Figure 5. Authors' keywords co-occurrences - 38 keywords divided into 6 clusters

The co-occurrence of authors' keywords network visualisation illustrates six key clusters, each representing a focus area.

The first cluster comprises consumer-centric themes, such as brand love, brand management, branding, conspicuous consumption, consumer behaviour, counterfeiting, culture, and marketing. This cluster emphasises consumer-related factors and their influence on branding and marketing strategies. Central themes like consumer behaviour and branding indicate their foundational role in understanding luxury consumption patterns. Counterfeiting is also prominent, reflecting challenges in maintaining brand authenticity and the use of technologies like blockchain to address this issue (Choi, 2019).

The cluster "digital and social media engagement" includes engagement, Facebook, Instagram, luxury branding, social media, trust, and user-generated content as topics. This second cluster highlights the developing role of digital platforms in shaping consumer engagement and brand trust. The importance of social media platforms (Kim and Ko, 2012) like Instagram and Facebook is evident. Also, user-generated content and consumer trust highlight the significance of authenticity and interactive branding in the digital era.

The third cluster is characterised by the following themes: attitude, brand equity, millennials, “need for uniqueness”, purchase intention, sharing economy, and social media marketing. This focuses on consumer motivations and purchasing behaviours, including generational shifts with the presence of “millennials” as a keyword. The sharing economy and the need for uniqueness illustrate how younger consumers redefine luxury through values like sustainability and exclusivity (Zhang and Kim, 2013).

The fourth cluster consists of themes such as brand extension, brand image, brand loyalty, brand personality, generation Y, and status consumption. This cluster explores the emotional and symbolic dimensions of luxury branding, with themes like brand image and brand loyalty, which are central to maintaining long-term consumer relationships. Emotional connections, as reflected in brand love and status consumption, are tied to identity signalling.

The fifth cluster focuses on sustainability and ethical consumption with the following keywords: Corporate Social Responsibility, fast fashion, luxury consumption, materialism, sustainability, and sustainable fashion. It highlights the importance of sustainability and ethical consumption. CSR and sustainable fashion reflect the industry’s response to consumer demand for eco-friendly practices.

The final cluster includes e-commerce, innovation, internationalisation, and supply chain management as themes. It addresses the technological and global aspects of the luxury fashion industry. Keywords like e-commerce and innovation reflect the growing role of digitalisation. At the same time, internationalisation highlights the industry’s expansion into global markets. Finally, supply chain management is pivotal for maintaining transparency and addressing ethical concerns (Choi, 2019).

4. Conclusion

This bibliometric analysis traces the evolution of the academic discourse on luxury fashion, systematically exploring 560 academic papers published between 1999 and 2024. It analyses the evolution of research and identifies key thematic clusters. The findings highlight how research in this field has adapted to address contemporary challenges, including sustainability, digital transformation, and changing consumer behaviour.

Consumer behaviour emerges as a central pillar of the literature and intersects with themes such as branding, counterfeiting, and conspicuous consumption. The studies analysed emphasise the influence that psychological, cultural, and generational nuances have on luxury consumption. The integration of digital

platforms, especially social media, has fundamentally changed the way luxury brands interact with consumers, with studies emphasising the role of trust, engagement, and user-generated content in building brand equity. Nevertheless, scholars also highlight the risks associated with digitalisation, such as brand dilution and reduced exclusivity.

The increasing focus on issues such as sustainability and ethical practices reflects the industry's response to growing consumer awareness and regulatory pressures. While luxury brands are leveraging their traditional focus on craftsmanship and durability to align with sustainability, critics have highlighted challenges such as greenwashing and the shallowness of some green initiatives.

In addition, the analysis highlights emerging areas of inquiry, such as anti-consumerism, the sharing economy, and the need for uniqueness. These themes reflect the changing expectations of consumers, particularly the younger generation. At the same time, they challenge traditional notions of luxury rooted in materialism and exclusivity, signalling a shift toward more sustainable consumption.

In detail, the first research question – How has the focus of research on luxury fashion evolved? – reveals an evolution of academic thinking in reference to this field, which can be divided into 3 periods. Indeed, early studies (1999-2010) focused on core concepts such as branding strategies, status signalling, and counterfeiting challenges, reflecting the traditional luxury emphasis on exclusivity and craftsmanship (Kapferer & Bastien, 2009; Fionda & Moore, 2009). In the subsequent period from 2010 to 2019, digital innovation emerges as a critical theme, with social media marketing (Kim & Ko, 2012), artificial intelligence-driven personalisation, and blockchain applications (Choi, 2019). These innovations have redefined consumer engagement and supply chain transparency. Finally, from 2020 to the present, there has been a clear shift toward sustainability, circular economy models, and ethical consumption, driven by new generations' demand for transparency and accountability (Cervellon et al., 2012; Turunen et al., 2020). This shift may partly be attributed to the COVID-19 pandemic, which has hastened research into digital transformation and resilience, highlighting the industry's adaptation strategies.

In reference to the second research question – What thematic clusters dominate the literature? – the research enabled the identification of 6 different clusters: (1) consumer-focused branding and counterfeiting, (2) digital/social media engagement, (3) generational motivations and buying behaviour, (4) brand loyalty and emotional connections, (5) sustainability and CSR, and (6) technological innovation and global supply chains.

Motor themes such as brand loyalty and brand image highlight the enduring importance of emotional connections with consumers, while sustainability and consumer behaviour emerge as basic themes. Niche topics such as e-service quality and chatbots reflect specialised digital advancements while emerging topics such as anti-consumerism and brand hate signal a growing critique of traditional luxury paradigms.

Hence, this study highlights the need for luxury fashion brands to balance heritage with digital responsiveness, tradition with innovation, prioritise authentic sustainability over tokenism, and address generational divides evident in values and consumption patterns.

4.1 Limitations and Future Research

The limitations of the study are mainly the use of the Scopus database and business-focused papers, neglecting any interdisciplinary articles on the topic analysed. Future studies could expand the dataset to include other databases and different types of publications, for example, conference proceedings. By mapping the intellectual structure and thematic evolution of luxury fashion research, this study provides a basis for further academic exploration and practical application. In fact, the findings show opportunities for future research to bridge the gap between established and emerging topics. Emerging areas include the role of blockchain in ethical sourcing, the redefinition of luxury by younger generations (i.e., millennials and Gen Z) through digital platforms, and the psychological factors of anti-consumer movements. For example, exploring sustainability and digital innovation integration could provide useful insights into aligning ethical narratives with advanced consumer engagement strategies. Similarly, examining the interplay between anti-consumerism and luxury branding could offer alternative perspectives on how brands might address the growing resistance to traditional consumption patterns.

Furthermore, future research could further examine what facilitates or hinders digital transformation in the luxury fashion industry, for example, to understand how emerging technologies interact with and influence organisations at a micro and macro level. In this sense, other research avenues could involve exploring how sustainability practices are integrated with management control systems or investigating how technologies influence consumer perceptions and behaviours in luxury fashion. Finally, future research could track the real impact of sustainability initiatives through longitudinal studies.

CHAPTER 2

Sustainable digital transformation: a case study in the luxury fashion industry

Abstract. Industry 4.0, digital transformation and sustainability are increasingly shaping the manufacturing sector. The objective of our study is to observe, through an explorative case study, how digital transformation is influencing SMEs, operating in the context of the fashion industry.

The case study aims to identify, through semi-structured interviews and the analysis of secondary sources, the enabling factors and barriers that have characterized the digital transformation of a manufacturing company focused on research and technological innovation since its inception. For the case unit, digital transformation seems to be a natural evolution of the company due to its intrinsic nature, oriented towards research, innovation and development, open to change in order to remain competitive and meet market demands. Future research is needed to examine the medium- and long-term implications and as yet little explored innovation paths related to the implementation of the I4.0 model in SMEs, especially in the fashion industry. From a managerial point of view, on the other hand, the study offers an example of how an SME managed to carry out its own internal reorganisation of production processes, and which barriers it overcame exploiting the knowledge and digital skills of its human resources combined with the experience gained over the years in the sector.

Keywords: digital transformation, case study, luxury fashion industry

1. Introduction

Nowadays, digital technologies are driving an all-encompassing transformation, with a particular impact on society. Interconnectedness, in fact, shapes everyday life, influencing various aspects such as work, leading to changes in both its internal organisation and its interaction with the outside world (Cosenza, 2014). Perhaps this change has also been influenced by the recent pandemic, which has shed light on environmental issues and inspired global decisions to reduce environmental impact towards sustainable solutions.

Industry 4.0 (Kagermann et al., 2011) and digital transformation (Westerman and Bonnet, 2015) have initiated a process of business transformation that results in a change defined as 'radical' (Gong and Ribiere, 2021).

The phenomenon of digital transformation is complex. It sets in motion a multitude of dynamics within the business ecosystem (Bertola and Teunissen, 2018), ranging from changing the mindset of people – both those with decision-making power and those with executive and production power – to production, procurement, and distribution processes. Furthermore, it induces continuous change due to evolving technologies which will necessarily have to be adopted by the company in order to remain competitive and to create value for both internal stakeholders (i.e., employees, managers, owners, etc.) and external stakeholders (i.e., customers, partners, suppliers, etc.) (Gong and Ribiere, 2021).

Some large companies (Subramaniam et al., 2019) have long since embarked on a digital transformation process, while SMEs have encountered obstacles (Rupeika-Apoga and Petrovska, 2022) in terms of insufficient financial resources, digital skills of managers and employees, cybersecurity issues, lack of specialists in the external labour market, and internal resistance to change. Meanwhile, others, more rooted in tradition, are still hesitant because they have to completely transform themselves. An example of this is the fashion industry. Clearly defined as a highly polluting industry, it needs not only to redefine production processes. It is also forced to use materials with a lower environmental impact driven by the purchasing needs of conscious consumers, mainly represented by Millennials and Generation Z (LYST Insights, 2020). In fact, the new generations seem to have a greater focus on sustainability (Salesforce, 2020).

The literature mentions the barriers that SMEs may face (Rupeika-Apoga and Petrovska, 2022). For the luxury fashion industry, Cabigiosu (2020) notes that there are not many studies that help to understand how SMEs in the fashion supply chain can still be competitive and the ways they should adopt to face digital transformation.

Our study tries to make a contribution by analysing what has been implemented by a company in the sector, the Dyloan Bond Factory, an SME strongly rooted in research, innovation, and technology. In doing so, an attempt was made to understand the difficulties and obstacles encountered by the company in its evolutionary process both internally and externally.

Considering the variety of challenges faced by SMEs in the fashion sector, consequently, the study answers the following research questions:

RQ1. What enablers factors influence the digital transformation of an SME in the fashion industry?

RQ2. What barriers characterize the implementation of the digital transformation of an SME in the fashion industry?

The paper is organized as follows. Section 2 contains a brief overview of the current literature on Industry 4.0, digital transformation, and the luxury fashion industry. Section 3 outlines the research methodology divided into two subsections, namely data collection, and the case study unit. Section 4 focuses on findings, which are divided into digital transformation of production processes and adaptation of systems, and enablers and barriers involved in digital transformation. Finally, Section 5 concerns the discussion and conclusions of the study, also delineating limitations, and suggestions for future studies.

2. Theoretical background

2.1 Industry 4.0

The term 'Industrie 4.0' emerged in 2011 (Kagermann et al., 2011) during the annual Hannover Industrial Fair, as a need to restore competitive production standards in the German manufacturing sector through technological innovation. This concept rapidly garnered the attention of several academic studies, conferences, and articles (Hermann et al., 2015), considering its novelty. As some scholars (Drath and Horch, 2014) note and as Hermann et al. (2015) point out, for the first time, a priori revolution is on the horizon that also entails great effects on the economic level. Industry 4.0 not only increases productivity but also creates benefits for the development of business models, products, and services (Kagermann et al., 2013; Kagermann, 2014).

In 2015, Deloitte noted that the concept of Industry 4.0 is widely adopted in Europe, particularly in the German manufacturing sector, from which it originates. Furthermore, it points out that "in the United States and, in general, in the Anglo-Saxon world, terms such as Internet of Things or Industrial Internet are also used" (Deloitte, 2015) and that in each case, "it refers to a further stage of development in the organisation and management of the value chain" (Deloitte, 2015).

Industry 4.0 is a new level of organisation and control of the entire product lifecycle value chain, which adapts to the increasingly personalized demands of consumers (Gilchrist, 2016) and implies the innovation processes due to digital transformation.

The concept of Industry 4.0 is not limited to 'smart manufacturing' but puts the factory at the centre and imagines its transformation through digitalisation. To think of a smart factory, where advanced robotic automation is controlled by a set of technologies, is simplistic (Gilchrist, 2016). The connection between machines and humans has many other implications. The smart factory is just one node in a complex networked ecosystem (Bertola and Teunissen, 2018). Therefore, Industry 4.0 and the implementation of its technologies require the revisitation of the entire business ecosystem with the creation of a new architecture of the same, characterized by vertical hierarchy and horizontal network (Kagermann et al., 2013). These enable the collection and exchange of data and information between any level of the organisation and along the value chain and, consequently, make possible a 'complete transparency' of the product-service life cycle (Bertola and Teunissen, 2018; Schwab, 2017).

2.2 Digital transformation

In academic studies, the term has no clear definition (Morakanyane et al., 2017) and, according to Gong and Ribiere (2021), since there is no explicit definition, it is necessary to conceptually distinguish similar terms.

The term Digital Transformation (DT) was first mentioned by Patel and McCarthy (2000). DT has had multiple interpretations, and many academics consider it as a slight change enabled by technology (Chanias, 2017), while for others, it is a more radical and evolutionary process that occurs over time (Janowki, 2015; Loebbecke and Picot, 2015).

Thus, in 2017, Morakanyane et al. (2017) felt the need to give an unambiguous definition of digital transformation through a systematic literature review. As a result, Morakanyane et al. (2017) define DT as "an evolutionary process that leverages digital capabilities and technologies to enable business models, operational processes and customer experiences to create value". This definition is expanded upon by Gong and Ribiere (2021), who state that digital transformation is "a fundamental change process, enabled by the innovative use of digital technologies accompanied by the strategic leverage of key resources and capabilities, aiming to radically improve an entity and redefine its value proposition for its stakeholders." (2021).

Digital transformation implies a radical change due to new digital technologies that involves not only the innovation of production processes but also a consequent transformation of resource strategies and key capabilities, such as digital knowledge and the innovative skills of human resources working in the company. Internal staff knows how the company works and understands what organisational and production changes may be necessary for its digitalisation (Furr et al., 2019). CEOs, general managers, and managing directors themselves are called upon to reorganize the company, ensuring the flexibility and openness required to respond effectively to the needs of innovation (Casalino et al., 2012).

Within the company, thus, it is necessary to acquire digital skills at all levels by leveraging pre-existing personnel or external teams that accompany the management staff in the choice of digital processes appropriate to the company's objectives in order to meet the expectations of stakeholders and customers. But another step must be taken for the people who actually work on the production processes, for whom the continuous updating of pre-existing human capital and the hiring of qualified personnel is opted for, since only the 'augmented' worker is able to combine his or her skills with digital technologies (Bertola and Teunissen, 2018).

2.3 Fashion industry

The fashion system fits into this picture, as the fashion industry's transition to 'smart factory' models is important as it can produce significant impacts in relation to more sustainable and efficient production methods (Bertola and Teunissen, 2018).

Listed as one of the most polluting industries (Amed et al., 2023), at the center of animal rights battles against the use of fur (Jana, 2020) or challenged for labour exploitation (Hoskins, 2015), the fashion industry is reconfiguring itself according to the pressing needs of the planet and thus aims to be ethical, digital and sustainable, attentive to the changing needs of consumers (Gong and Ribiere, 2021). Therefore, the fashion industry, in its components, Luxury Fashion and Fast Fashion, has a double challenge to complete. The first is digital transformation in relation to the interconnection and automation of production processes, as well as staff and management skills and products/services, and the second, no less important, related to the first, is sustainability (Bertola and Teunissen, 2018).

Moreover, the fashion industry is a complex system consisting of a variety of companies ranging from fibre and yarn producers to the production of parts (semi-finished) or finished garments, upstream and downstream

supply chains (Magni and Noè, 2017). The fashion system thus includes companies with brands that produce their own collections and subcontracted companies, often small and micro-sized, that operate on behalf of principals (Magni and Noè, 2017). Consequently, all upstream production processes (such as R&D, sourcing, inbound logistics, etc.) and downstream functions (such as outbound logistics, retail, customer service, etc.) should be included in the architectural 4.0 model (Bertola and Teunissen, 2018). Digital transformation becomes the internal digitalisation of each segment, each manufacturer and supplier to trigger that process of immediate cooperation for the acquisition of data from each area of the supply chain. As mentioned earlier, digital transformation is to be thought of as a business ecosystem comprising digital production processes assisted by competent and creative 'augmented' workers (Bertola and Teunissen, 2018) and by a managerial staff capable of adopting digitalisation processes suited to their business purposes without neglecting the needs of the socio-environmentally sensitive customer. In the fashion world, therefore, digitised tools that are sustainable and innovative raw materials that are not harmful to the environment are sought after.

In the fashion world, we see on the one hand the adoption of big data, Internet of Things (IoT), cyber-physical systems, blockchain (Birkel et al., 2019; Dakhnovich et al., 2019; Caldarelli et al, 2021) and on the other hand the adoption of more industry-specific sustainable tools such as digital printing or designer practices that themselves aim at sustainability such as virtual prototyping (Bertola and Teunissen, 2018), to the experimentation of eco-friendly materials such as cellulose and others being tested such as orange fibre, grape skin (Bertola and Teunissen, 2018) or to the reuse and recycling of fabrics, clothes, and accessories, i.e. circular fashion.

In this complex context, luxury fashion becomes ‘ethical’ fashion (Joy et al., 2012) for its internal organisation and production methods, ‘circular’ fashion for recycling and upcycling, ‘conscious’ fashion because it is green and sustainable, ‘slow’ fashion because of the possibility of renting and sharing. Moreover, it is projected into the future, given the potential and the various activities available online. One example is the NFT, already pioneered by some pioneers such as Gucci and Louis Vuitton (Bingol, 2021; Belardinelli, 2021; McDowell, 2022, McDowell and Shoaib, 2022).

3. Methodology

The article presents a case study of a company in the luxury fashion industry, the Dyloan Bond Factory, in which one of the authors was a "participant as observer" (Smith, 2019) for a period of four months and was able to directly observe the activities, employee interactions, and workplaces in the field.

The case study seeks to examine a contemporary phenomenon, meaning the digital, as well as sustainable, transformation in the fashion world. This was observed within the company in question in its real-life context (Yin, 2006) to better understand which implemented Industry 4.0 technologies were best suited for its production processes to:

- achieve its goals,
- to remain competitive in the marketplace (Barney, 1991; Hollander, 2018),
- or to meet the needs of the brand for which Dyloan is a subcontractor.

The case study, relevant to the research area in which the researcher is interested (Yin, 2018), aims to analyse concrete contemporary phenomena "in their uniqueness, as part of a particular scenario and its interactions" (Patton, 2002). Specifically, the purpose of this case study (Yin, 2018) is to describe, understand and examine enablers and barriers that affect digital transformation in the reality of an SME in the textile and clothing industry. While being aware that a case study limits the ability to generalise the results to other contexts (Yin, 2018), at the same time we contend it is able to offer a contribution, in the form of an additional example, to the multifaceted situation that is affecting the industrial sector and, in particular, the fashion system.

3.1. The case study unit

Dyloan Bond Factory was founded in 1987 by Anna Maria and Loreto Di Rienzo.

From the very beginning Dyloan set itself the goal of specializing in Research and Innovation to find new ideas and propose innovative solutions for the world of fashion and luxury. In 2003, part of the company's current structure began to take shape, consisting of two closely connected realities: Dyloan Bond Factory Ltd. in the Chieti area (Abruzzo) and Dyloan Studio in Milan (Lombardy), now renamed D-House by Dyloan. While the former deals with the production of garments for well-known luxury fashion brands, the latter focuses on research and innovative development. D-house is not the subject of the case study. Although, it is

worth noting that this is where innovative solutions are researched, then tested and applied in Dyloan Bond Factory.

In July 2022, the company signed a partnership agreement with Pattern, which specializes in designing garments for luxury fashion. In the same year, the Ltd. acquired Orlando Confezioni in Villa Magna (Chieti) and T-Shock in Silvi (Teramo), which concentrate on printing on fabric and leather, thus increasing in-house production capacity.

Despite customers all over the world, the company focuses on Made in Italy and local companies. For this reason, a project to expand the Chieti site was approved in 2023, which plans to increase the number of employees from the current 230 to 350 over the next two years.

3.2. Data collection

During the research development, as a "participant as observer" (Smith, 2019), it was possible to gather information from multiple sources (Creswell, 2013; Yin, 2009).

The first phase consisted of gathering information from secondary sources that also provided an opportunity to formulate interview-related questions, i.e., archive documents and sustainability reports, national and local articles on the company's activities, websites (the Dyloan Bond Factory website and the Pattern website), and archive videos (seminars and workshops) on the company's YouTube channel.

This was followed by a second phase. From the information obtained and already having an overview of the topic (Alsaawi, 2014), at both the general and specific levels of the company under analysis, semi-structured interviews were conducted.

The reason behind the figures chosen is that they were directly involved in the company's digital transformation, and they could recall and explain in detail the interventions. The figures interviewed are sustainability specialist, production manager, IT manager, and R&D manager.

The interviewees were informed at the beginning of the interview that they would be asked questions related to the company and the innovative techniques implemented. The interviews did not have set times, as they varied depending on what was said by the interviewees, the semi-structured interview having been chosen (Corbetta, 1999). However, they lasted an average of a minimum of twenty to thirty minutes per person. The questionnaire is based on an outline (De Rose, 2003), a list of questions that summarizes the key themes of the research and implicitly contain hypotheses, correlations, and tend to the narration of facts. Since it is not rigid,

it gives the opportunity to interact with the interviewee. In some cases, based on the answers given, the conduct of the interview has varied with the addition of questions that were not anticipated but were necessary to elaborate on the answer given previously. The interviews were audio recorded and transcribed faithfully, in Italian, and then translated into English, taking care not to misrepresent what the interviewees said or to make lexical or formal changes, to better understand the very content of their statements.

The data collected from primary and secondary sources constituted the analysis and interpretation of the results that allow outlining the current situation of the company to answer the above research questions and in view of the findings of the academic studies considered.

4. Findings

4.1. Digital transformation of production processes and adaptation of systems

The company is faced with the problem of how to combine digitalisation and know-how in the fashion world and, consequently, how to reconcile innovation and the sartorial tradition typical of Made in Italy. Indeed, as the R&D manager claims, “at present, digitalisation affects the entire fashion system transversally, from trade fairs to showrooms to the operational part of design and production”. Thus, the company is oriented towards understanding “how digitalisation can support the habit of working manually, of building with the craftsman's hands, of shaping fabrics, and of making traditionally finished garments”. The focus is on the production process as a whole, i.e., on the technological innovation of digitalised machinery and the employees who are able to “combine digital design and realisation capabilities with traditional manufacturing skills”.

Digital transformation encounters quite a few obstacles and already in 2018, the McKinsey report (Andersson et al., 2018) underlines the key principles for the manufacturing sector, namely the optimisation of existing processes, the digitalisation of processes along all phases of the fashion cycle, the effective and sustainable management of warehouse and transport processes and the optimisation of garment production.

The definition of “open factory” set in a dynamic context, given by CEO and founder, hints at the very nature of Dyloan. Through research and experimentation, the company has introduced tools and machinery used in other manufacturing sectors such as heat sealing, taping, or ultrasound.

Accordingly, at the time of the digital transformation, as an anticipatory company, it sought the opportunity to make the most of the know-how and experience accumulated over time. So much so that, as the sustainability

specialist noted, “technologies that were already in use have become digital”, such as laser cutting, now digitalized, which “allows the graphics department to communicate directly with the machine and, by means of files, initiate the cutting and packaging processes”.

The company sought to optimize existing processes and identified which technologies to implement to best meet the company's objectives.

According to the R&D manager, Dyloan's partnership project with Stratasys, one of the leading companies in industrial 3D printing, is a significant example because it kick-started the digital transformation process. In fact, “the synergy between the technology and subsequent training” offered by Stratasys to specific Dyloan personnel and the skills and experience of the industrial manufacturing world in the company, “allowed the innovative technology to be tested and adapted to the production cycle”.

Currently, Dyloan uses 3D in its establishment, both as additive manufacturing (or 3D printing) and for virtual prototyping (Stjepanovič et al., 2012). The latter is important for the simplification of the ways and times of the creative process because, by reducing the number of steps, it allows for more streamlined procedures in the production of prototypes, feasibility studies, and cost analyses. Furthermore, it offers an advantage from the point of view of sustainability, as “it does not involve waste or the creation of moulds in the production process” (Stratasys, 2022) and, as underlined by the sustainability specialist, “can be produced close to the end consumer”.

Digital technologies and 3D operational processes are present in Dyloan and offer the company possibilities for sustainability, flexibility, and speed in production.

4.2. Enablers and barriers involved in digital transformation

The project that Dyloan did with Stratasys leads to answering the first research question (RQ1) as it can be defined as a determining factor that influenced the company's digital transformation. The project, which started from the intuition of the R&D manager, has revolutionised the entire company. Beginning with 3D, it has seen both a digital transformation and a reconfiguration at an organisational level.

It should not be forgotten that digital transformation has, as its protagonist, the company personnel (Venier, 2017), the only one who cannot be automated but who has the skills to reorganise the company and who understands better than others what organisational and productive changes may be needed for corporate digitalisation.

Between the end of 2020 and the beginning of 2021, alongside the two founders, respectively Managing Director and Head of R&D, a General Manager was first introduced, and then the figures of Operations and Organisation Manager and ICT Manager were introduced. The General Manager led the company through a restructuring of the entire company, taking it from a 'family' company to a managerial one.

Under the impetus of 3D, the digital transformation began by reorganizing the production process with the prospect of renewing the machinery thanks to tax breaks and 4.0 funding provided by national and international bodies. Then, as remarked by the sustainability specialist, it led to “a gradual renovation of the various company departments thanks to subsidies and partnerships with innovative technology companies”.

Another factor that has undoubtedly influenced the DT is the company's flexibility given by the company itself and its culture. An example of this is the BFxMED project. This arose from the need that emerged during the pandemic to produce clothing and protective equipment for doctors and nurses. This led the company to become part of the certified Italian personal protective equipment (PPE) supply chain. Even though the BFxMED project isn’t directly linked to the digital transformation process it shows the ability of the company to be flexible and adapt to different situations. Linked to this there’s the continuous search for innovative and sustainable materials represented by partnership projects, for example, with Mogu, Dinamica by Miko and Woolmark, and innovative and sustainable tools with Coloreel and The Woolmark Company.

With reference to the second research question (RQ2), Dyloan did not encounter any strong economic barriers in finding financial resources (Rupeika-Apoga and Petrovska, 2022) and made use of partner companies in the technology sector that helped the company in the acquisition of innovative technologies and also contributed to staff training.

Both primary and secondary sources concur that the company has mostly young staff within it who show no “opposition” to getting involved and experimenting with new things. Therefore, even the digital training of employees was experienced as a necessary adaptation of know-how to innovative technologies. Employee training is carried out whenever necessary, depending on the new technologies adopted, the number of machines, and the number of staff employed - for example, as the sustainability specialist observes, “six people were trained for digital printing, which corresponds to the number of staff employed to use it”.

While Dyloan did not encounter major obstacles in finding the financial resources and training most of the employees, it did encounter other difficulties, which emerged from direct interviews and listening to some archived videos of the company.

In a workshop on digital transformation in Italian SMEs, broadcast live on 8 February 2022 on the Confindustria Chieti Pescara YouTube channel, Dyloan's CEO identifies an 'external' obstacle: the lack of standardisation of machinery operating systems. The company buys machinery - e.g., printers, lasers, sewing machines - from different suppliers who have a 'different interpretation' of Industry 4.0. Thus, the problem lies in the fact that “Industry 4.0 is the integration of automated systems into the company's ecosystem”, but machines with different software cannot communicate with the company's management system, “causing a major problem for the company” (Confindustria Chieti Pescara, 2022).

In an interview conducted in person, another problem emerged, again related to operating systems. The digital transformation process is mostly viewed as internal to the company, not concerning communication with the outside world. For example, as the sustainability specialist points out, for some raw materials, such as RDS down, it is “necessary to use a specific traceability system to guarantee the quality of that type of product and, consequently, its certification”. In these cases, it is “a time stamp applied by a supply chain tracker”, which is “an internal tool of the corporate group” to which Dyloan belongs, and it is the latter that then “communicates with the outside world through the use of a further tool”. To summarise, the barrier seems to be the existence of a multitude of systems that mostly do not communicate with each other.

The enablers and barriers, which emerged from the case study, are summarised in Table 1.

Table 1. Enablers and barriers of Digital Transformation

Enablers	Barriers
Partnership projects	Internal barriers: company personnel “opposition” to new processes
Financial resources	External barriers: existence of a multitude of operating systems and lack of standardisation between them
Flexibility of the company	
Company personnel	Financial barriers

5. Discussion and conclusion

The world of luxury fashion, which has always been anchored in tradition, is today forced to transform and accept challenges that test its founding values.

Digitalisation, the pandemic period, climate change, and the related shift in the common mentality (Cabigiosu, 2020; Achille and Zipser, 2020) have led the industry to considerable changes. These are affecting production processes, sourcing and traceability of raw materials, and the relationship with suppliers and customers in a vision of complete eco-sustainability (Finn, 2011; Godart and Seong, 2017)

Recent years have witnessed an acceleration of digitalisation that has led the fashion system to project itself into the future. It is taking advantage of the potential offered by the Internet, such as e-commerce, online showcases, and streaming fashion shows. The latter were experimented with during the pandemic period and then were normalized, later leading it to become interested in the metaverse (Park and Kim, 2022) and NFTs (Bingol, 2021; Belardinelli, 2021; McDowell, 2022; McDowell and Shoaib, 2022). The allure of the virtual and the potential that fashion can exploit often overshadow the real wearable, which leads to rethinking internal reorganisation through the implementation of digital tools and techniques (Bassano et al., 2020; Hastig and Sodhi, 2020; Bindi et al., 2021).

Thus, brands seem to be engaged on two fronts, one virtual and another much more concrete one of transformation into Industry 4.0 (Braglia et al., 2021) for the immediate development of Luxury 4.0 (Mosca and La Rosa, 2019). Most studies and articles seem to deal mainly with the side of digitalisation that concerns the end customer, delving into topics such as omnichannel, phygital, augmented and virtual reality (Aiolfi and Sabbadin, 2019; Silva et al., 2020; Jung et al., 2021; Lawry, 2022; Harba, 2019).

This study examines the internal digital transformation of a company that, although not a major player in the industry, operates in the fashion system, produces for and collaborates with well-known luxury fashion brands. In fact, the case study illustrates the example of a particular SME in the fashion industry that focuses on research, innovation, and development – factors that have undoubtedly driven towards a sustainable digital transformation of those production processes that the company needs to operate and remain competitive in the market.

Academic studies identify barriers to the digital transformation of SMEs in the manufacturing sector. The main ones are due to “a lack of appropriate financing options, insufficient digital skills among employees,

internal resistance to change, and managers' lack of knowledge about how to implement DT" (Rupeika-Apoga and Petrovska, 2022). Similar barriers are also identified in relation to the fashion industry (Magni and Noè, 2017; Sanlorenzo et al., 2009).

In the case in question, the company tried to overcome financial barriers (RQ2) with projects financed by national and international bodies and with partnerships (RQ1), which enabled the company's digital transformation to be initiated. Therefore, it is necessary to have people within the company who are motivated to look for collaborative projects, monetary incentives, or possible partnerships that can stimulate the further evolution of the, already begun, digital transformation.

It is possible to consider financial barriers as a type of hybrid barrier, as they can come from both inside and outside. In this regard, it should be emphasized that a decisive factor for the strategies adopted by an SME in the textile-clothing sector is the "size variable" which has a great impact "in terms of available financial and managerial resources" (Sanlorenzo et al., 2009).

Digital skills must be inherent in employees and management, as only with such skills can digital transformation and innovative technologies be seen as facilitators of a process from communication and design realisation to production.

Thus, the obstacle to the synergy between digital innovation and the production process is to be found in transversal skills. It is necessary to train already experienced figures in the company who enhance their skills with digital training or guided by external figures linked to other sectors and brought into the company context. In addition, at the national level, it is necessary to create infrastructures and skills for human resources management, including at the university level. Digitalisation is an acceleration of a new generation that can interpret the sector and the supply chain differently with an optimisation of the relationship with which it will use the product with characteristics of efficiency, creativity, and sustainability.

Therefore, a company's human capital can be seen both as an enabler (RQ1) of digital transformation and as a barrier (RQ2) to the company's DT.

The company must be research oriented. Digital technologies are constantly evolving, and this drives it to improve its digitalisation by upgrading technologies and employees (RQ1). The fashion industry is committed to innovative solutions that respect craftsmanship, such as sustainable technologies and materials. One example is prototyping, which has a double advantage: economic sustainability - and also the reduction of

delivery times - and environmental sustainability (Fondazione Symbola, 2022), as there is not as much waste as with manual production.

As the R&D manager emphasizes, the manufacturing industry, aided by a network of flexible and decentralized production and service units, “must be proactive for innovative, company-tested and designer-tested materials and processes”. Thereby becoming a “link between the technological world and the creative world” (Fondazione Symbola, 2022).

As already mentioned, digital transformation leads to the adoption of new technologies and machinery that must be able to communicate with each other, as a requirement of Industry 4.0. The lack of communication between the operating systems of the adopted machinery and the operating systems already present in the company can represent an external barrier (RQ2), not always of a temporary nature, to DT. In the case analysed, these are temporary barriers due to Dyloan's recent entry into Pattern (July 2022), as well as those that emerged from the interviews at the other two Dyloan sites, Silvi and Villa Magna, where pre-existing systems are currently being adapted to the system used by the Dyloan printing sites in Chieti and Milan.

Interestingly, the barriers identified by academic studies are not always present. In the case of the company under review, for example, barriers were mostly seen as enabling factors. This was possible due to the nature of the company, which has always been oriented towards research and development and supported by personnel with innovative and digital skills, to the extent that the company works in synergy with D-House, a research and design center. In fact, many projects and partnerships have resulted from innovative paths in collaboration with technology and textile companies.

In conclusion, the case study is an example of how digital and sustainable transformation for a company like Dyloan, which is flexible and open to change with a company's culture deeply rooted in research and innovation, is a natural evolution, a decisive and, at the same time, dynamic response to the new and pressing demands of the socio-economic and environmental context.

5.1. Limitations, future studies, and managerial implications

The limitation of the case study is that it based its analysis on a single company, so it is not possible to generalize the results to the context. This limitation, on a theoretical level, attests to the existence of a company that by its definition is technological, innovative, and research oriented. On the other hand, it may give the

possibility of extending the research with future studies to other companies in the textile sector, in order to compare different realities and understand, for example:

- what factors influenced their digital transformation,
- what tools have been adopted to reduce the impact on the environment,
- how any obstacles to the innovation of production processes and the consequent transformation at a cultural and organisational level have been addressed,
- what the digital knowledge and skills of the human resources working in the company are.

Furthermore, an observation that arises spontaneously from the analysis of the primary and secondary sources and that could be interesting for possible future studies concerns the coexistence of several systems with different communication languages. This could lead one to speculate and, consequently, raise a possible problem, that could be interesting to research, namely that there may be a loss of information in the transition from one system to another.

In addition, the case study could offer insights into the implementation of the I4.0 model in fashion SMEs, prompting scholars and academics to examine the medium- and long-term implications and still little-explored innovation paths.

At the managerial level, the study may offer suggestions on how to implement and improve innovation processes to make the company flexible, competitive, and responsive, as the right technologies in synergy with people and processes can offer companies the possibility to quickly adapt to sudden changes or opportunities offered by the global market in which they have to compete.

CHAPTER 3

Decoding Sustainability: a Text Mining Analysis of Luxury Fashion Industry Reports

Abstract: This study analyses sustainability strategies in the luxury fashion industry, focusing on the interplay between sustainability strategies and management control systems (MCSs). The research aims to identify best practices and prevailing standards in sustainability reporting through text mining of sustainability reports from four luxury fashion holdings. While emerging technologies enhance transparency, the lack of standardized reporting frameworks underscores areas for improvement. The findings also suggest that forthcoming regulations, such as the EU's Corporate Sustainability Reporting Directive, may significantly influence sustainability reporting practices within this sector. This research contributes to the academic discourse by providing a comprehensive analysis of sustainability strategies and practices in the luxury fashion sector, along with the related practices of governance and control.

Keywords: text mining analysis, sustainability reports, sustainability accounting, luxury fashion industry

1. Introduction

The fashion industry, especially the luxury sector, plays a crucial role in shaping global environmental and social outcomes. According to the Ellen MacArthur Foundation (2017), the fashion industry is one of the most resource-consuming industries in the world. It contributes significantly to environmental degradation through its high levels of waste, pollution and resource consumption. In response to these challenges, brands in this industry face increasing pressure to adopt and implement sustainable practices. There is also a growing demand for transparency: stakeholders, including consumers, investors, and regulators, are demanding full reporting on sustainability practices initiatives. Luxury fashion offers a compelling case for the analysis of sustainable practices. This sector not only has a substantial impact on the global economy but also involves a wide range of stakeholders, including suppliers, manufacturers, consumers and policymakers. The industry's high level of dynamism, driven by changing consumer trends and preferences, further complicates its sustainability efforts. Moreover, the luxury fashion industry is often under scrutiny for its environmental and social impacts, with

concerns ranging from excessive resource use to labour practices within global supply chains. Furthermore, little is known about the practices of management control directly aimed at making business more sustainable or the role of emerging technologies in enhancing the integration between Management Control Systems (MCSs) and Sustainability Control Systems (SCSs).

Accordingly, this study seeks to answer the following research questions: What sustainability strategies have luxury fashion companies implemented? What have they measured so far in their sustainability efforts? Have emerging technologies played a role in facilitating such strategies and measurements? To explore these questions, this paper conducts an exploratory investigation by analysing companies' official communications, focusing on sustainability reports.

The investigation of emerging technologies in sustainability reporting is anchored by the "digitainability" concept, which emphasises the transformative potential of merging digitalisation and sustainability (Gazzola et al., 2024; Lichtenthaler, 2021). Digitality goes beyond mere technological adoption (Lichtenthaler, 2021). Thus, there must be a strategic alignment to balance efficiency and environmental care.

In the context of luxury fashion, this concept can be translated into the use of emerging technologies to improve transparency and mitigate risks such as increased energy consumption, a critical trade-off highlighted in digitainability frameworks (Lichtenthaler, 2021). In fact, blockchain, AI, and IoT are no longer peripheral tools but transformational factors that redefine how companies manage sustainability (Gazzola et al., 2024).

The topic of this research is particularly relevant in light of growing regulatory demands—such as the EU's Corporate Sustainability Reporting Directive (CSRD)—and consumer expectations for traceability and accountability in supply chains. Without explicit documentation of technology integration in reports, stakeholders—internal and external—risk overlooking digital innovations that underpin measurable sustainability outcomes. Therefore, this research aims to bridge the gap between the concept of digitainability present in the literature, interpreted as a balance between sustainability and digitalisation, and its practical implementation in communications by luxury fashion brands to their stakeholders. Hence, the analysis of sustainability reports in search of evidence on the use of technologies aims to explore how luxury fashion brands are implementing these principles.

The study uses text mining to systematically extract and analyse sustainability narratives presented by leading luxury fashion brands. This method allows for identifying key themes, trends, and patterns in how

these companies communicate their sustainability strategies and results, providing insights into the current state and future direction of sustainability in the luxury fashion industry.

2. Theoretical background

2.1 Sustainability in the Fashion Industry

Sustainability is the new ‘gold standard’ for competitive advantage. Agenda 2030 (Organizzazione Nazioni Unite, 2015) has institutionalised previous actions through which companies have begun answering the call for a more sustainable world. Sustainability has been broken down by the UN into several different goals, from poverty to global partnership. While some of these goals are direct concerns of companies, they all potentially necessitate some level of engagement.

The fashion industry is not exempt from a specific commitment towards sustainability, which poses specific challenges to the sector. Indeed, the fashion industry is considered one of the most polluting around the world (Mok et al., 2022). Even the juxtaposition of the terms 'sustainability' and 'luxury' appears to be an oxymoron (Akrout & Guercini, 2022), although scholars contend that luxury and sustainability do not exclude each other. The growing pressure from consumers and other stakeholders has obliged luxury fashion companies to change their business strategy towards more sustainable and transparent operations (Campos Franco et al., 2019). Relatedly, Campos Franco et al. (2019) suggest six lessons to managers in the industry after giving several examples of best sustainable practices already experimented in the industry. The first lesson emphasises the importance of aligning actions with sustainability principles. The second lesson highlights the necessity of communicating these sustainable practices effectively. The third lesson advocates for sourcing alternative materials. The fourth lesson stresses the importance of maintaining favourable working conditions. The fifth lesson involves embedding sustainability innovations throughout all levels of operations. Finally, the sixth lesson advises measuring the environmental, social, and economic impacts of sustainability efforts using appropriate frameworks. These suggestions encompass all organisational levels up to involving the whole supply chain and requiring, in the end, radical changes of traditional strategies and operations.

2.2 Control Systems and Sustainability Reporting

On the path toward sustainability, companies have also started establishing formalized systems of control - SCSs, to monitor the implementation of this strategy and to report on their performance. The degree of formalisation of such systems varies according to the dimensions of the company (Della Porta et al., 2023). Sometimes SCSs are integrated with the management MCSs, often not (Gond et al., 2012). However, scholars have generally posited that environmental management accounting has the potential to integrate sustainability into business strategies and operational processes (Gibassier & Alcouffe, 2018). Consequently, companies should be committed to pursuing integration between SCSs and MCSs. This need has also been discussed in the national scientific debate, which has reaffirmed the role of control systems in the pursuit of sustainability (D'Onza, 2022; Marchi, 2020; Marchi & Paolini, 2020; Fiorentino et al., 2016). Marchi and Paolini (2020) suggested to use an income perspective to integrate accounting and budgeting systems, promoting a "systemic reading" of indicators without placing emphasis on just a specific area of performance, increasing the value created in the supply network forging partnerships with strategic suppliers, and instilling a culture of sustainability in management control practices integrating financial and sustainability measures.

Sustainability accounting, in such a context, is considered to be "the branch of accounting that requires organisations to pay attention to environmental, social and governance matters by disclosing non-financial information about the organization". The output of Sustainability accounting is a report that the companies publish to communicate their performance, which, as suggested by many scholars, should be based on an appropriate framework of measurement (e.g. Campos Franco et al., 2019). The topic has assumed such a strategic relevance that in 2022, the European Union published a CSRD (Directive (EU) 2022/2464), mandating standardized ESG reporting for large companies from 2024, enhancing transparency and comparability and aligning with the EU's Green Deal and SDGs. However, as stated by Schaltegger et al. (2006) these reports are not to be conceived only as an extension of traditional mandatory financial reporting but also as the interplay between external reporting and internal activities of setting goals, collecting data and sharing sustainability information (in other words a way to link strategic management, management, accounting and reporting).

While the previous invaluable insights are relevant to every type of organisation, there is not much literature about the challenges of integrating MCSs and SCSs in the luxury fashion sector as well as related practices of

sustainability reporting. Specifically, studies on luxury fashion and sustainability reporting have highlighted an inadequate definition of performance indicators, a lack of transparency in communication (Karaosman et al., 2015) , and the fact that although luxury companies are focused on sustainability, there is much heterogeneity in terms of practices (Di Leo et al., 2023).

Critiques of sustainability reporting in the luxury sector point to systemic problems of legitimacy. Disclosures often privilege symbolic management over functional action. In this sense, Wells et al. (2021) point out that luxury conglomerates such as LVMH and Kering frequently engage in selective reporting, preferring the emphasis on positive outcomes and the omission of negative impacts, therefore undermining stakeholder trust. This reiterates the need for standardised regulatory frameworks and technological tools, such as adopting blockchain to improve traceability and accountability, thus closing the gap between reported statements and concrete performance.

2.3 Emerging Technologies in the Luxury Fashion Industry

It is acknowledged that there is an increasing usage of Artificial Intelligence and emerging technologies, accounting included (Valentinetti & A. Rea, 2023). These are applied in a multitude of ways, such as automating data collection and improving the accuracy of sustainability metrics. To name a few, natural language processing (NLP), machine learning (ML) and blockchain enable brands to track and report key sustainability metrics more effectively, thereby improving transparency and accountability (Lu & Franco, 2021; Amed et al., 2020). Therefore, the application of these technologies in the luxury fashion industry should be considered a crucial part of the digital transformation process (Bertola and Teunissen, 2018), to enable brands to remain competitive and meet the sustainability demands of authorities and consumers as well as to link MCSs and SCSs.

In this sense, the concept of “digitainability” combines digital transformation and sustainability, leveraging digital tools such as blockchain, AI, and the Internet of Things (IoT) to improve resource efficiency, transparency, and circular economy practices (Gazzola et al., 2024). Aligning technology with environmental and social goals enables challenges such as waste reduction and supply chain management while fostering stakeholder engagement (Gazzola et al., 2024). Digitainability implies that digital tools act as catalysts for

systemic change. Nevertheless, their effectiveness depends on strategic integration into management control systems (MCS) and reporting mechanisms (Gazzola et al., 2024; Lu & Franco, 2021). Different types of technologies have different functionalities. In detail, blockchain can ensure ethical sourcing traceability, while artificial intelligence can optimize resource use (Lu & Franco, 2021). However, technologies are often undervalued in official statements such as sustainability reports, creating a visibility gap between implementation and reporting (Oguntegbe et al., 2022).

In addition, Lichtenthaler (2021) points out the dual nature of digitainability. In that, technologies such as blockchain improve traceability, but, at the same time, they can jeopardise sustainability goals through energy-intensive operations. Lichtenthaler (2021) identifies four types of business strategies, urging luxury brands-often in high digitainability/low sustainability contexts—to shift to balanced digitainability (scenario 4) by integrating sustainability metrics.

According to the previous premises and gaps in the literature, our study aims to analyse, with reference to the luxury fashion industry, its past strategic processes and related control practices for sustainability (Della Porta et al., 2023) as they are depicted in sustainability reports and facilitated by emerging technologies, seen as a specific aspect of digital transformation. We explored sustainability reports as tracks of sustainability strategies and practices in their interrelation with MCSs, eventually enhanced by new emerging technologies.

The next section depicts the methodology used to answer our research questions.

3. Methodology

This study uses text mining as an analytical tool to examine a sample of 20 sustainability reports from 4 luxury fashion brands. The objective is to identify common reporting themes, best practices, and standards used to further uncover trends and insights (Yadav & Pathak, 2017; Zhao & Priporas, 2017).

We used KNIME, an open-source data analytics platform, to extract and identify key themes from the sustainability reports through text mining analysis. Figure 1 shows the workflow used in KNIME. The main phases are data preprocessing and topic extraction, following established methodologies for uncovering trends and insights in sustainability reporting (Berthold et al., 2009; Yadav & Pathak, 2017).

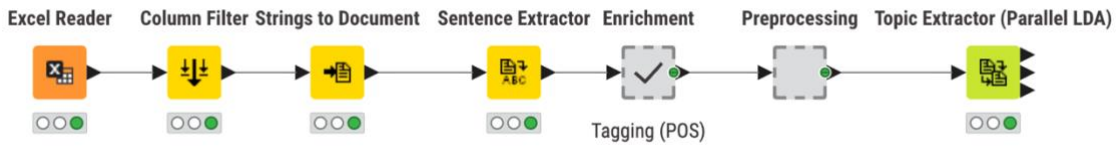


Figure 1. KNIME workflow

To comprehensively capture management control practices, the dataset was divided into distinct categories, and seven-word clouds were generated, each representing one category, i.e., strategic planning, budgeting, financial measurement systems, non-financial measurement systems, hybrid measurement systems, project management, and evaluation and rewards. This method allowed for a detailed analysis of the specific aspects of management control practices across the reports. However, given the nature of this short paper, it was deemed more appropriate to include a single, comprehensive word cloud that encapsulates all the sustainability reports analysed. This word cloud, which also covers management control practices, provides a broad overview rather than the specific insights that the individual word clouds would offer. The comprehensive word cloud will be discussed in the next section, while the detailed word clouds have been omitted to maintain focus and conciseness.

4. Findings and discussion

The text mining analysis of sustainability reports from four luxury fashion holdings, comprising 20 brands in total —LVMH, Kering, Capri Holdings, and PVH—reveals a diverse set of approaches to addressing key aspects of sustainability. As highlighted in the theoretical background, these approaches reflect each brand's strategic priorities and responsiveness to global environmental and social challenges.

LVMH and Kering lead in integrating sustainability into their core business strategies, particularly in areas like supply chain management, environmental and social programs, and emission reduction. Their efforts align with the broader shift in the luxury fashion industry towards sustainable practices, driven by increasing stakeholder demands for transparency and accountability (Campos Franco et al., 2019; Mok et al., 2022). Capri Holdings and PVH, while also committed, appear to be at an earlier stage in their sustainability journeys, with opportunities for further development in areas such as transparency, supply chain optimisation, and the

integration of programs supporting sustainable development, such as PVH's Fashion Forward. Figure 2 also reveals a strong emphasis on the integration of Management Control Systems (MCSs) within the sustainability strategies of these luxury fashion brands. Terms such as 'program management,' 'traceability,' and 'accounting' underscore the critical role of MCSs in ensuring that sustainability initiatives are systematically monitored, evaluated, and aligned with overall business objectives (Gond et al., 2012; Gibassier & Alcouffe, 2018).

The text mining analysis identified eight key themes within the sustainability reports as a whole, as illustrated in Figure 2. The first theme is the implementation of sustainability strategies in supply chain management. All four brands emphasize the importance of integrating sustainability into their supply chains, with a specific focus on environmental impact reduction. This focus is consistent with the broader industry trend towards sustainable supply chain management (Seuring & Müller, 2008). Tools such as the Higg Facility Environmental Module (Higg FEM) are frequently referenced, particularly by LVMH and Kering, indicating a commitment to standardized sustainability metrics and continuous improvement. The strategic alignment of sustainability within supply chain operations underscores the brands' efforts to minimize their environmental footprint, while also enhancing the efficiency of their supply chains.



Figure 2. Main topics wordcloud, 8 clusters – 2018-2022 sustainability reports

Furthermore, terms like ‘fiscal year,’ ‘business,’ and ‘program’ suggest that these brands increasingly align their Sustainability Control Systems (SCSs) with traditional MCSs. This facilitates a more cohesive approach to integrating environmental and social metrics into their financial and operational reporting frameworks (Della Porta et al., 2023).

The concept of digitainability (Gazzola et al., 2024) provides a critical framework for understanding how technologies like blockchain, AI, and ML can enhance the integration of Sustainability Control Systems (SCSs) and Management Control Systems (MCSs). By aligning digital innovations with sustainability goals, these tools enable real-time data collection, accuracy, and transparency (Gazzola et al., 2024). For instance, as already mentioned, blockchain ensures supply chain accountability, while AI-driven analytics optimizes resource efficiency (Lu & Franco, 2021).

Despite using performance indicators to monitor environmental and social impacts, findings reveal low integration between SCSs and MCSs. Luxury fashion brands could thus improve strategic coherence and operational efficiency by embedding digital solutions into control systems (Gazzola et al., 2024).

Health, safety, and program management also emerged as significant concerns, especially in relation to the working conditions within the supply chains. The reports frequently highlight initiatives aimed at ensuring the health and safety of workers, particularly in production facilities. These concerns reflect broader issues within global value chains, where maintaining high labour standards is critical to ethical business practices (Amankwah-Amoah, 2016; Lund-Thomsen & Lindgreen, 2014). Kering and PVH, in particular, demonstrate a strong focus on program management to uphold high standards of workplace safety and well-being. This approach aligns with the understanding that effective management of labour conditions, including health and safety, is crucial for mitigating risks in labour-intensive industries (Narula, 2019; Huq, Stevenson, & Zorzini, 2014). Such initiatives are essential for complying with international safety standards and addressing the ethical imperatives associated with responsible corporate governance (Crane & Matten, 2016). The wordcloud also reflects the ongoing efforts to standardize reporting practices, as seen in the frequent references to words like ‘Higg FEM’ and ‘management.’ These suggest that luxury brands are adopting standardized metrics and frameworks to enhance the control and comparability of their sustainability efforts and strategies across different business units and geographic regions (Schaltegger et al., 2006).

The global supply chain and supplier optimisation strategies discussed in the reports reveal a resolute effort to streamline operations and reduce inefficiencies. There is a clear focus on optimizing supplier networks to enhance sustainability outcomes. These efforts are in line with the principles of sustainable supply chain management, which emphasize the need for efficiency and environmental responsibility (Carter & Rogers, 2008; Seuring & Müller, 2008). Brands are actively working to reduce their environmental impact through strategic supplier partnerships and by implementing best practices across global facilities. Such efforts improve operational efficiency and contribute to the brands' overall sustainable development goals by reducing waste and resource consumption (Gold, Seuring, & Beske, 2010).

The mentions of 'emissions,' 'facilities,' and 'waste' also indicate the use of performance indicators within both MCSs and SCSs to monitor and control environmental impacts. By incorporating these metrics into their broader management frameworks, luxury fashion brands are better equipped to manage risks, ensure compliance, and drive continuous improvement in their sustainability performance (D'Onza, 2022; Marchi & Paolini, 2020).

In the context of business and financial management in the luxury fashion industry, the reports reflect an increasing recognition of the financial implications of sustainability. Sustainability is positioned as a key factor in long-term business planning, with brands integrating it into their annual financial strategies. This shift towards viewing sustainability as integral to corporate success aligns with the broader trend in management theory, which posits that sustainability and financial performance are mutually reinforcing (Porter & Kramer, 2011). LVMH, for example, explicitly ties its sustainability initiatives to business performance, highlighting the economic benefits of responsible environmental practices. The co-presence of 'business' and 'environmental' could imply a cross-functional collaboration between sustainability teams and management control functions, which is essential for integrating sustainability into the core business strategy and ensuring that environmental and social objectives are set while also being thoroughly managed and achieved (Gibassier & Alcouffe, 2018).

The analysis also highlights the integration of environmental sustainability and social programs within the brands' broader corporate strategies. These programs are designed to reduce environmental impact while fostering social equity and community engagement. This dual approach is increasingly recognized as essential for achieving true sustainability, which encompasses both environmental stewardship and social responsibility

(Elkington, 1997; Porter & Kramer, 2011). Kering stands out due to its strong focus on both environmental and social sustainability, with programs specifically designed to protect the environment and ensure the well-being of communities impacted by its operations. In addition, terms like 'traceability' and 'accounting' shed light to the increasing reliance on data-driven decision-making tools within the MCSs of these brands. Such tools allow for a more accurate tracking of sustainability efforts, ensuring that the data collected is integrated into the overall management processes to support strategic planning and operational efficiency (Valentinetti & Rea, 2023; Lu & Franco, 2021).

Sustainability accounting and traceability are identified as crucial tools in the management of waste and biodiversity conservation. The reports suggest that these accounting practices are becoming increasingly sophisticated, as brands like Kering and LVMH adopt advanced traceability systems to monitor and manage their environmental impact (Bebbington & Gray, 2001). Such systems enhance accuracy in reporting and support better decision-making, particularly regarding waste management and biodiversity conservation efforts (Epstein & Roy, 2001). By tracing the origins and environmental impacts of materials, these brands are better equipped to implement strategies that minimize harm to the environment (Schaltegger & Burritt, 2010).

The incentivizing of environmental action through awareness initiatives is another key theme. Brands are leveraging awareness campaigns to encourage both internal and external stakeholders to adopt more sustainable practices. LVMH, for example, employs targeted initiatives to raise awareness among its workforce and customers, effectively linking environmental action to broader corporate goals. Research suggests that these initiatives, when supported by remuneration and incentives, can significantly drive engagement and motivate action on sustainability issues (Bansal & Roth, 2000; Aguilera et al., 2007). Figure 2 shows the dual focus that brands are trying to adopt to ensure that sustainability is effectively integrated into their core business strategies, supported by management control systems that drive improvement and long-term success (Marchi & Paolini, 2020; Schaltegger et al., 2006).

Finally, the reports underscore the critical issue of climate impact and emission reduction. All four brands acknowledge the significant role that the fashion industry plays in contributing to climate change, with particular attention given to reducing Scope 3 emissions. Kering, in particular, has been proactive in setting ambitious targets for emission reduction, aligning its strategies with global climate goals (Sullivan & Gouldson, 2012). The emphasis on reducing emissions not only addresses regulatory pressures but also meets

the growing demand from consumers for climate-conscious products. The brands' commitment to reducing their climate impact is demonstrated through various initiatives aimed at minimizing emissions throughout the supply chain, from raw material sourcing to product distribution (CDP, 2017).

5. Conclusion

This study contributes to the academic literature by providing a comprehensive analysis of sustainability reporting practices in the luxury fashion industry and related management control practices. Luxury fashion brands had the opportunity to improve their sustainability performance and reporting practices as part of their journey towards digital transformation (Bertola and Teunissen, 2018; Fiorentino et al., 2016) by reshaping performance evaluation systems to monitor financial, social and environmental results. However, the findings suggest the opportunity for standardised reporting frameworks in sustainability practices applied in the luxury fashion industry (Tan & Wang, 2018; Schaltegger & Wagner, 2006). This study underscores the urgency of adopting digital frameworks (Lichtenthaler, 2021; Gazzola et al., 2024) to reconcile digital innovation with sustainability imperatives.

Findings also unveil, generally, a low integration level among MCSs and SCSs, although a set of performance indicators is used to monitor environmental and social performance.

Furthermore, these findings resonate with Lichtenthaler (2021) and Wells et al. (2021). The first warns about "unbalanced digitalisation", while the latter noted that fragmented reporting practices in luxury corporations often obscure measurable outcomes, thus mirroring a broader industry trend of symbolic legitimacy-seeking. They note that brands tend to disproportionately highlight eco-design initiatives (e.g., packaging reductions) and omit systemic issues – a gap that technologies like IoT and blockchain could lessen by enabling real-time data collection (Wells et al., 2021).

The use of emerging technologies such as blockchain for more accurate data collection in sustainability reporting is increasingly recognized as a critical tool for enhancing transparency and precision in shared data (Lu & Franco, 2021; Valentinetti & Rea, 2023). However, it is often the case that these technologies, despite their potential to significantly improve transparency and accountability in supply chains, are not explicitly mentioned in the reports, which could be seen as leaving a gap in the visibility of the digital innovations that are actively driving these advancements (Oguntegbe et al., 2022).

Finally. the available data collected and analysed may be a limitation. The time period analysed does not include the year 2023, as not all brands have made last year's report public. Therefore, to keep the sample of analysed reports homogeneous, the available reports of the mentioned year were not included in the analysis. Future research could expand the dataset to include more brands and explore different technology applications. Further empirical research is also needed to understand levels of integration among MCSs and SCSs.

This study aligns with Wells et al. (2021), who argue that sustainability reports must adhere to rigorous standards such as GRI to avoid greenwashing and legitimise claims. The upcoming EU CSRD directives represent an opportunity to standardise information. However, as Wells et al. (2021) caution, compliance alone is insufficient without integrating technologies to ensure accuracy and comparability. Furthermore, luxury brands facing CSRD must move from isolated digital or sustainability initiatives (scenarios 2 and 3) to integrated digitainability strategies (scenario 4) (Lichtenthaler, 2021). Future research should explore how emerging technologies can be designed according to the principles of "sustainable digitainability" (Lichtenthaler, 2021), ensuring that efficiency gains from adopted technologies do not compromise progress toward the SDGs.

Finally, future studies could perform a comparative analysis of sustainability reports from these brands before and after the implementation of the European Union's Corporate Sustainability Reporting Directive (CSRD), which requires standardised ESG reporting for a broad range of companies starting in 2024. This analysis would provide valuable insights into the evolution of how non-financial outcomes are communicated to stakeholders, especially in terms of transparency, standardisation, and the level of detail presented (Di Leo, Marino, & Morelli, 2023; Valentinetti & Rea, 2023).

CHAPTER 4

The Sustainable Fashion Dilemma: Exploring what Influences Consumer Decisions in a Digital Age Through Survey-Based Insights

Abstract

This study analyses the elements that influence consumer decisions and behaviour in the context of fashion, focusing on the interplay between affordability, sustainability and technical innovation. It uses paradox theory to investigate the contradictions between rapid fashion consumption and pressing issues such as sustainability. A quantitative survey was conducted with 383 participants, using snowball sampling to ensure demographic diversity. Descriptive and inferential statistics were used. Specifically, chi-square tests, multiple linear regression, and ANOVA were adopted to assess correlations between aspects such as customer behaviour, demographics, and perceptions of blockchain technology.

Affordability emerged as the main motivation for purchase decisions (mean = 8.05), surpassing style and sustainability. Despite the growing awareness of sustainability among the younger generation (Gen Z/Millennials), financial constraints continue to drive fast fashion purchases. Blockchain technology was rated positively for increasing supply chain transparency (mean = 4.32) and reducing counterfeiting (mean = 4.48), but its direct influence on purchase intentions was limited. There is still a substantial gap between intentions and practice, with price and availability identified as the main barriers to sustainable purchasing.

This study offers practical implications for brands' integration of omnichannel strategy, alignment of blockchain adoption with consumer expectations, and reconciliation of ethical ideals with economic realities. Future studies could focus on other emerging technologies, such as AI or AR/VR, to understand the impact that different technologies have on consumers.

Keywords: fashion industry, purchase intention, shopping experience, blockchain, sustainability, survey

1. Introduction

The fashion industry operates in a dynamic environment characterised by changing market trends and consumer expectations. The latter are increasingly aware of social, technological and climate change, requiring a balance between innovation and environmental, social and economic awareness.

This sector is a driver of global economic growth, contributing over $2.5 trillion a year to the world economy (Fashion United, 2023). Simultaneously, it contributes to environmental degradation, being responsible for 10% of global carbon emissions and 20% of wastewater (UNEP, 2023). Consequently, these aspects amplify the industry's duality.

This study aims to investigate these dynamics through the lens of paradox theory, which explores how competing but interdependent priorities coexist and influence behaviour (Smith & Lewis, 2011). An example of this can be observed in the growing demand for sustainability that contrasts with the appeal of fast fashion, known for its affordable prices and rapid production cycles (Bhardwaj & Fairhurst, 2010; Shen, 2014).

This contrast is further complicated by the digital age. Consumers are inundated with conflicting signals: social media campaigns promoting ‘conscious consumerism’ coexist with influencer campaigns advocating disposable fashion, creating a cognitive dissonance (Festinger, 1957; Carrington et al., 2014) that paradox theory helps to resolve (Smith & Lewis, 2011). For example, while influencers normalise fast consumption cycles (Hwang & Zhang, 2018; Djafarova & Bowes, 2021), sustainability advocates exploit the same platforms to criticise the environmental toll of fast fashion (Niinimäki et al., 2020). This dynamic reflects the ‘gap between intention and ethical behaviour’ (Carrington et al., 2014), where consumers struggle to align their values with their actions.

The first question guiding this study is: What factors determine consumer preferences and behaviour in the fashion industry, particularly with regard to sustainability, affordability and technological innovation?

To explore this further, a further question was considered: What role do emerging technologies and shopping experiences in different channels play in shaping consumer decisions in the fashion industry?

The analysis considers emerging technologies, such as blockchain technology and omnichannel retailing, which can be seen as redefining the ‘value’ proposition for consumers. For example, virtual proofs can reduce returns and waste, but their adoption depends on whether they align with consumers' desire for convenience or conflict with their need for tactile engagement.

The urgency of these questions is underlined by regulatory changes, such as the EU's Digital Product Passport initiative (European Commission, 2022) or New York's Fashion Sustainability Act (New York State Senate, 2022), which aim to impose transparency and accountability. At the same time, grassroots movements such as #WhoMadeMyClothes and platforms specialising in the sale of second-hand products reflect a cultural awareness of the environmental and social impact of fashion. However, the persistence of ultra-fast fashion giants such as Shein - which reported a 60 per cent increase in revenues in 2022 despite criticism (Niinimäki et al., 2020) - highlights unresolved contradictions at the core of consumer behaviour (Carrington et al., 2014).

To answer the research questions, a survey methodology was used to explore consumer behaviour, preferences and perceptions in the fashion industry. The sample analysed consisted of 383 respondents.

The following section analyses the theoretical context, focusing on the different sectors of the fashion industry—fast, high street, and luxury—the adoption of emerging technologies in the industry, and the role of sustainability within it.

2. Theoretical Background

The fashion industry is a complex and multifaceted sector that can be broadly classified into three main segments, each reflecting distinct consumer priorities, market strategies, and value propositions. These segments not only illustrate differences in pricing and style but also highlight varying approaches to sustainability, ethical considerations, and technological innovation (Cachon & Swinney, 2011; Joy et al., 2012).

2.1 Fashion Industry Segments

Fast fashion caters primarily to cost-conscious consumers who desire up-to-the-minute trends at affordable prices. This segment is characterized by rapid production cycles, frequent inventory turnover, and a heavy reliance on global supply chains (Bhardwaj & Fairhurst, 2010). Although fast fashion democratizes access to trendy apparel, its business model has significant environmental and social implications. Critics point to the unsustainable use of resources, excessive waste generation, and poor labour conditions as central issues (Joy et al., 2012; Niinimäki et al., 2020). The speed and scale of production in fast fashion often compromise quality

and ethical standards, leading to broader debates about the long-term sustainability of such practices (Fletcher, 2013). Despite these challenges, fast fashion remains popular due to its ability to quickly respond to market trends and consumer demand.

Recent studies have also suggested that consumer knowledge and attitudes toward sustainability influence their purchasing behaviour, although a gap remains between awareness and action (Kozar & Hiller Connell, 2013). Furthermore, research has highlighted how digital engagement and social media influence consumer behaviour and ethical decision-making in the fashion industry (Bowen, 2013). Moreover, research on fashion marketing has highlighted concerns regarding greenwashing, where brands falsely present their products as environmentally friendly. Studies have found that brands participating in Black Friday promotions often engage in greenwashing or bluewashing strategies to maintain an illusion of sustainability while capitalizing on high sales volumes (Sailer et al., 2022).

Positioned between fast fashion and luxury, high-street fashion offers consumers a balanced combination of style, quality, and moderate pricing. However, there is no universally agreed-upon definition of "high-street fashion" in academic or industry discourse. The term broadly refers to mainstream, accessible fashion sold by retailers with physical storefronts in urban commercial districts (Crewe, 2017). High-street brands bridge the gap between the affordability of fast fashion and the prestige of luxury brands, often prioritising trend-driven designs while incorporating slightly better-quality materials and ethical practices than fast fashion counterparts (Barnes & Lea-Greenwood, 2006). Unlike luxury fashion, high-street brands lack exclusivity and artisanal craftsmanship but appeal to consumers seeking durability, design, and responsible production at accessible prices (Jackson & Shaw, 2009). Critically, the term's ambiguity stems from its overlap with fast fashion in terms of rapid trend adoption, though high-street brands often distinguish themselves through marginally improved labour standards and sustainability claims (Pookulangara & Shephard, 2013).

Luxury fashion is defined by its exclusivity, exceptional craftsmanship, and premium pricing. This segment targets consumers who value high quality, uniqueness, and the status associated with owning luxury products (Kapferer & Bastien, 2012). Brands in this segment often emphasize artisanal techniques, heritage, and a strong narrative of quality and exclusivity. In recent years, sustainability and ethical practices have gained prominence even within luxury fashion, as consumers increasingly demand transparency, responsible sourcing, and environmental accountability (Wang & He, 2022). Luxury brands are gradually integrating sustainable

practices into their production processes, driven by both regulatory pressures and shifting consumer expectations, which often view sustainability as a hallmark of true luxury (Cavender & Hellebrandt, 2020).

Consumer attitudes toward luxury sustainability vary across generations. A study on young Italian consumers indicates that while they appreciate sustainable practices in luxury fashion, they remain heavily influenced by brand prestige and exclusivity (Pencarelli et al., 2019). The integration of slow fashion principles into luxury markets is becoming more prominent as brands seek to balance exclusivity with sustainability. Studies on slow fashion within luxury contexts suggest that some brands successfully integrate circular economy models, reducing waste and improving resource efficiency (MacGregor Pelikánová & Sani, 2023).

Second-hand luxury consumption has also gained traction as an alternative sustainable practice. Consumers motivated by fashionability and environmental consciousness increasingly purchase second-hand luxury items, reducing waste and extending product lifecycles (Ferraro et al., 2016). The second-hand market, however, presents paradoxes regarding its contribution to sustainability, as some consumers engage in excessive consumption under the guise of sustainability (Panju, 2024).

2.2 Emerging technologies in Fashion

Technological innovation is reshaping the fashion landscape, offering novel ways to enhance both production processes and consumer experiences. Among the most notable technologies are blockchain, augmented reality (AR), virtual reality (VR), artificial intelligence (AI), and Internet of Things (IoT) applications (Choi & Shen, 2017). Emerging technologies are also contributing to sustainable fashion by reducing waste, enhancing supply chain transparency, and improving the personalisation of consumer experiences.

Blockchain has emerged as a critical tool for increasing transparency and trust within the fashion industry. This technology enhances traceability by creating an immutable ledger that records every stage of a garment's lifecycle. Luxury brands are using blockchain to verify product authenticity, ensuring consumers receive genuine items instead of counterfeits. Additionally, blockchain applications are being used to certify ethical labour practices and promote sustainability initiatives by tracking the environmental impact of production processes (Turker & Altuntas, 2014). In the context of upcycling, blockchain can validate the origins of discarded materials and document their transformation into new products, offering brands a way to substantiate

claims about circular design principles and resource efficiency (Wang et al., 2020). By providing a secure and immutable ledger, blockchain technology can track products from raw material sourcing to the final sale, thereby ensuring authenticity and ethical compliance throughout the supply chain (Turker & Altuntas, 2014). This capability addresses growing consumer concerns about counterfeit goods and unethical labour practices, as every step of the product lifecycle can be verified and audited (Saberi et al., 2019).

AR and VR technologies are revolutionizing the consumer shopping experience. Augmented reality allows customers to virtually try on clothes and accessories, reducing the need for in-store visits and minimizing return rates. VR, meanwhile, enables immersive fashion shows, digital fitting rooms, and virtual storefronts that replicate the physical retail experience. Some brands are integrating AR into mobile applications to provide interactive and personalized styling recommendations. Furthermore, these technologies help fashion companies cut down on production waste by allowing for more accurate pre-purchase decision-making (Javornik, 2016; Poushneh & Vasquez-Parraga, 2017). Augmented reality allows customers to virtually try on clothes and accessories, thereby reducing the uncertainty often associated with online shopping. Virtual reality, on the other hand, creates immersive environments that can simulate in-store experiences, which is particularly valuable in the context of digital retail (Javornik, 2016; Poushneh & Vasquez-Parraga, 2017). These technologies not only improve customer engagement but also help in reducing the environmental impact associated with returns and overproduction (Pantano et al., 2017).

Artificial Intelligence applications in fashion range from demand forecasting and inventory management to personalized marketing and design automation. Machine learning algorithms analyse consumer behaviour, predicting trends and optimizing inventory levels to reduce overproduction. AI-powered chatbots enhance customer service, while generative design models create unique clothing patterns based on inputted parameters, streamlining the creative process. Additionally, AI is being used to develop smart fabrics that adapt to body temperature and movement, improving both functionality and sustainability (Wang et al., 2019). By analysing consumer behaviour and market trends, AI can optimize production schedules and reduce waste (Wang et al., 2019). However, despite their transformative potential, these technologies face scepticism regarding usability, integration challenges, and data privacy concerns. As a result, widespread adoption remains gradual, with both brands and consumers cautiously exploring their benefits alongside potential risks (Duan et al., 2019).

Another transformative technology in the fashion industry is the Internet of Things (IoT). IoT-enabled smart tags and RFID chips are being used to track garments from production to retail, providing real-time inventory data and improving supply chain efficiency. Smart clothing embedded with sensors can monitor health indicators or adjust fit dynamically, offering both practical and innovative applications. Moreover, IoT technology allows brands to enhance customer engagement by providing personalized recommendations based on user preferences and past purchases.

2.3 Sustainability in Fashion

Sustainability has become a central concern as awareness of environmental and social issues has increased. The fashion industry is criticized for its contribution to pollution, waste, and unethical labour practices, prompting brands to adopt more sustainable practices and emphasize transparency (Shen, 2014). Fashion's environmental impact includes high water consumption, pollution from dyes and chemicals, and significant textile waste, making sustainability a pressing issue (Niinimäki et al., 2020).

To address these challenges, companies are exploring circular economy models, eco-friendly materials, and initiatives for supply chain transparency (Saberi et al., 2019). However, the high costs associated with sustainable products present a barrier to accessibility, particularly for price-sensitive consumers. Additionally, as already mentioned with Kozar and Hiller Connell (2013), while many consumers endorse sustainability in principle, their purchasing decisions frequently prioritise convenience and affordability, highlighting an intention-behaviour gap (Mandarić et al., 2022).

Efforts to make sustainable fashion more mainstream require collaboration between policymakers, brands, and consumers. Educational initiatives, price incentives, and digital engagement strategies can encourage consumers to adopt more ethical fashion habits, contributing to a more sustainable future for the industry.

3. Methodology

This study employed a quantitative survey methodology to explore consumer behaviour, preferences and perceptions in the fashion industry. It focuses in particular on three specific sectors of the fashion industry,

i.e., fast fashion, high street fashion and luxury fashion. The data analysed consists of survey responses from a sample of 383 respondents in order to ensure demographic diversity and a representation of different consumer habits. Survey participants were recruited via survey dedicated sites and social media groups, and mostly using snowball sampling. This type of sampling is a non-probability method defined as yielding "a study sample through referrals made among people who share or know of others who possess some characteristics that are of research interest" (Biernacki & Waldorf, 1981). This approach facilitated access to a broader and more varied participant pool, aligning with the study's goal of capturing diverse consumer perspectives across demographics.

3.1 Survey design

The survey was designed to address the research questions (RQ1 and RQ2) systematically by integrating established concepts from previous literature. The eight sections constituting the survey administered are outlined below, and the survey structure can be viewed in Appendix 1. An exclusion criterion was established to ensure the relevance of respondents: if a participant selected "none of the above" in response to the first question regarding their predominant shopping preference in the last six months, they were excluded from the survey. No other exclusion criteria were applied, as the aim was to include as many participants as possible to gain a comprehensive understanding of fashion consumers' behaviours and perceptions of the aspects central to the survey.

First, the section on purchasing preferences focuses on consumers' choices regarding the type of fashion - fast fashion (Joy et al., 2012), high street fashion, luxury fashion (Wang, 2022) -, the frequency of buying and the duration of storing an item before discarding, questions adapted from Gwozdz et al. (2017). Furthermore, in the same section, respondents were asked to rank nine different aspects by importance, as identified by Hennings et at. (2012).

The second section, on consumer engagement with fashion brands, aims to understand how consumers interact with these brands on social media platforms and the role that social media plays in influencing consumer behaviour and brand engagement.

The third section on general blockchain technology understanding assesses respondents' perceptions of blockchain technology and its potential impact on the fashion industry. Respondents were asked to rate their agreement with several statements on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). The statements were adapted from Garg et al. (2021) and aim to assess respondents' general understanding and attitudes toward blockchain technology without prior explanation.

The fourth section on purchase intention evaluates respondents' willingness to purchase from fashion brands that have adopted blockchain technology. Adapted from Balakrishnan and Dwivedi (2021), respondents were asked to rate their agreement with statements such as: "I would like to purchase fashion items from a brand that uses blockchain technology," "I would like to repeat my experience with such a brand," and "I am inclined to purchase from a brand that uses blockchain technology to track its production process."

The fifth section, on shopping experience satisfaction, measures respondents' satisfaction with the shopping experience when blockchain technology is applied. The statements are adapted from Yilmaz and Temizkan (2020). They aim to assess how blockchain technology impacts the overall shopping experience and whether it meets or exceeds consumer expectations.

The sixth section on channel choice and the shopping experience examines how different factors shape the shopping experience based on the selected channel (physical stores, e-commerce, or both). Drawing on Yillehto et al. (2021) and Singh and Sahay (2011), respondents were asked to evaluate the importance of factors such as channel choice, convenience, entertainment, and social interactions. Furthermore, respondents were prompted to indicate their preferred channel for purchasing fashion products (physical stores, e-commerce, or both) and to assess the relevance of specific aspects connected to their chosen channel. For physical stores, these aspects include ambience, physical infrastructure, marketing focus, convenience, and safety. In the case of e-commerce, these factors include product information quality, user interface quality, service information quality, purchasing process convenience, security perception, product attractiveness, and user participation.

The seventh section, on consumer attitudes toward sustainability practices in the fashion industry, evaluates respondents' attitudes toward sustainability in the fashion industry. Adapted from Mandarić, Hunjet, and Vuković (2022), the statements aim to assess how sustainability practices influence consumer purchasing decisions and their perceptions of sustainability in the fashion industry.

Finally, the demographic section includes variables such as age, annual income, gender, employment status and country of residence to facilitate the analysis of the behavioural patterns of different socioeconomic groups. These variables were selected on the basis of their documented influence on fashion consumption patterns (Jackson & Shaw, 2001).

3.2 Hypotheses development

The study tested ten hypotheses grouped into five thematic categories to ensure a comprehensive analysis of the key factors influencing fashion consumer behaviour by exploring the drivers and barriers of sustainable consumption, demographic influences, and the role of technology in shaping retail experiences.

The first set of hypotheses, "Sustainable Preferences and Behaviours" (4 hypotheses), explores how awareness, income, and marketing influence sustainable consumption and identifies barriers such as price and availability.

These align with studies emphasizing the role of awareness, income levels, and brand communication strategies in fostering ethical consumption patterns (Mandarić et al., 2022; Wang & He, 2022).

H1: Consumers informed about sustainability issues are more likely to prefer and buy from fashion brands that leverage sustainable practices.

H2: Consumers with higher annual incomes are more likely to prioritize and purchase sustainable fashion products.

H3: The main barriers to sustainable fashion consumption are price and availability.

H4: Sustainability-focused marketing by fashion brands positively influences consumer perceptions and engagement.

The second set, "Demographic and behavioural insights", comprises 2 hypotheses. It examines how generational differences and demographic factors (e.g., gender, education, or country of residence) influence sustainability priorities and the general engagement of consumers with this aspect. These are supported by generational theory and prior research on demographic variations in sustainable consumption behaviour (Kozar & Hiller Connell, 2013).

H5: Younger consumers (Gen Z and Millennials) demonstrate greater awareness and concern for sustainability than older generations.

H6: Demographic factors such as gender, education, and geographical location significantly influence sustainability priorities.

The third set, "Technology Adoption and Preferences," also comprises two hypotheses. It investigates the impact of emerging technologies, such as blockchain, on shopping experiences and trust in fashion brands' sustainability claims. These hypotheses reflect the growing research on the role of technology in improving retail experiences and bridging trust gaps in sustainability claims (Saberi et al., 2019; Garg et al., 2021).

H7: Fashion brands' adoption of blockchain technology enhances the shopping experience by improving transparency and automation, even if these factors do not directly drive purchase intent.

H8: Blockchain technology strengthens consumer trust and purchasing behaviour by addressing ethical concerns (e.g., counterfeit risk reduction, supply chain traceability).

The fourth set, "Omnichannel shopping preferences", consists of one hypothesis. It addresses consumers' shopping preferences and their emphasis on convenience and flexibility. The hypothesis builds on findings by Gwozdz et al. (2017), who identified omnichannel strategies as crucial for modern retail success.

H9: Consumers preferring omnichannel shopping experiences value convenience and flexibility more than those favouring a single channel.

The fifth and final set focuses on the willingness to pay for sustainability. It comprises one hypothesis that assesses whether consumers are willing to pay a higher or premium price for certified sustainable fashion products. This is based on the work of Mandarić et al. (2022) on the price-sustainability trade-off in consumer decision-making.

H10: Consumers are willing to pay a premium for fashion products certified as sustainable or environmentally friendly.

3.3 Data Analysis and Visualisation

A combination of descriptive and inferential statistical techniques was employed. Descriptive statistics provided an overview of consumer preferences, purchasing behaviours, technology adoption rates, and demographic distribution trends.

Inferential statistical methods included chi-square tests to assess associations between categorical variables, particularly those related to sustainability priorities and demographic factors such as gender, education, and country of residence. Multiple linear regression was used to evaluate the predictive power of key variables, including the influence of income and sustainability awareness on purchasing behaviour and the impact of technology familiarity on adoption rates.

Additionally, ANOVA was conducted to identify differences in mean responses across various groups, such as generational differences in sustainability awareness and income-based disparities in sustainable purchasing behaviours. The software Jamovi was used to perform descriptive and inferential analyses on the data, while Microsoft Excel was used to construct graphs to effectively show the results.

4. Empirical Findings

4.1 Sample Demographics

The survey included 383 respondents, with Figure 1 showing the gender distribution. The majority of respondents were female (72.3%), while males represented 25.6%. A small percentage (2.1%) preferred not to disclose their gender.

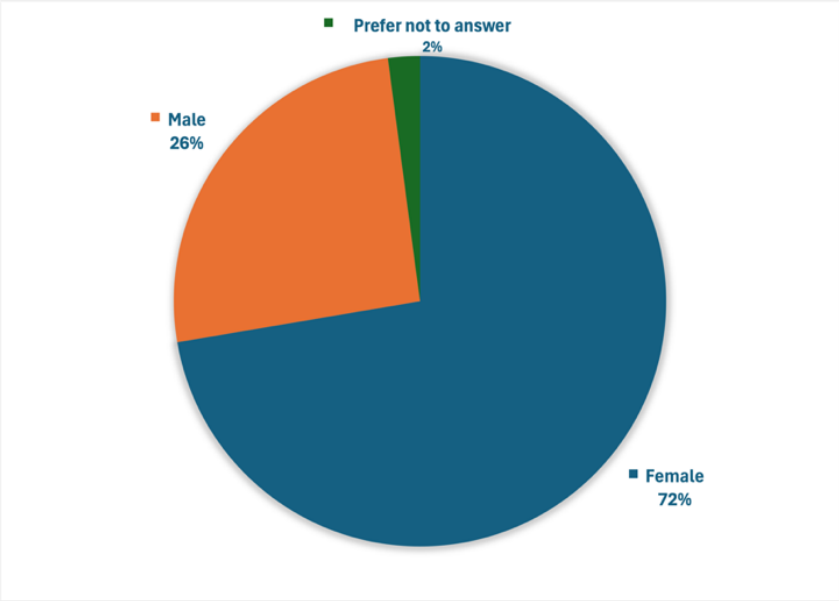


Figure 1. Sample gender distribution

The age group 18-34 constituted the majority (70.8%) of respondents, with 41.0% (157) aged 18-24 and 29.8% (114) aged 25-34. The remaining respondents were distributed as follows: 8.1% (31) aged 35-44, 8.4% (32) aged 45-54, 7.3% (28) aged 55-64, and 5.5% (21) over 65.

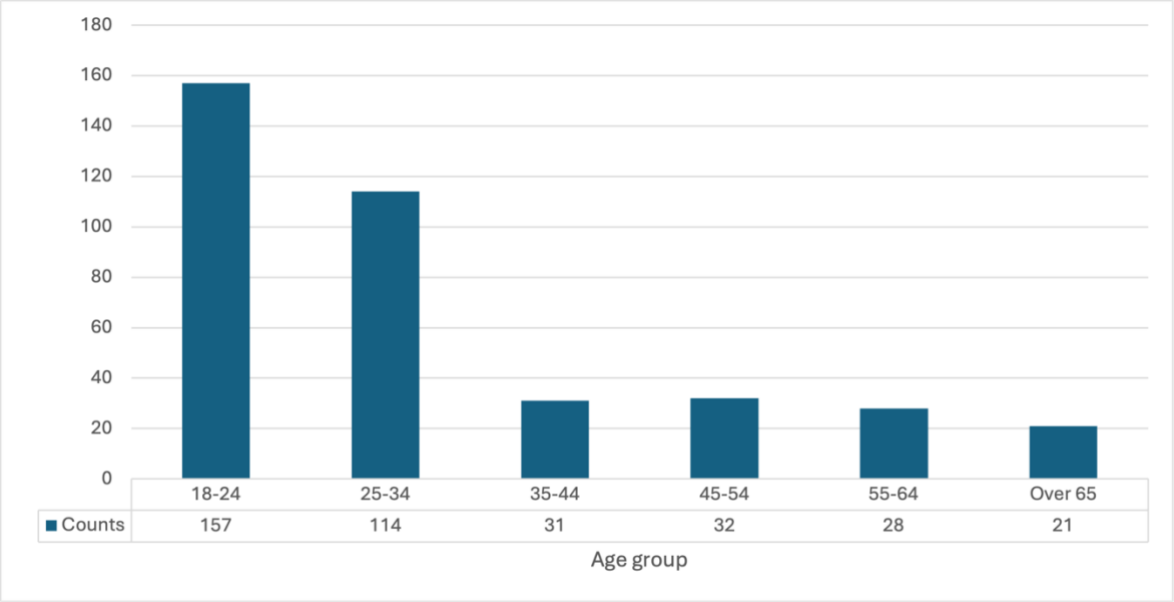


Figure 2. Sample age distribution

Regarding employment status, most respondents were students (52.2%) or employed individuals (33.2%). Smaller percentages included the self-employed (7.6%), retired individuals (5.5%), and unemployed respondents (1.6%).

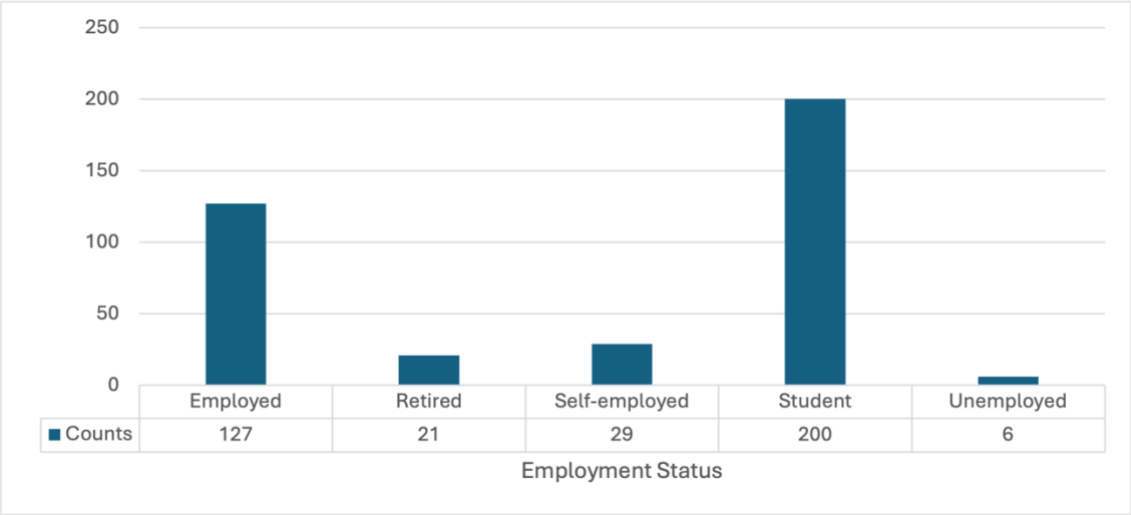


Figure 3. Sample employment status distribution

Annual income data indicated that 39.2% of respondents earned less than £10,000 (€11,700), while 49.1% reported incomes between £10,000-39,999 (€11,700-46,798). Smaller percentages earned between £40,000-69,999 (€46,799-81,897) and £70,000-99,999 (€81,898-116,996), at 7.6% and 2.3%, respectively. Only 1.8% of respondents reported earnings over £100,000 (€116,997).

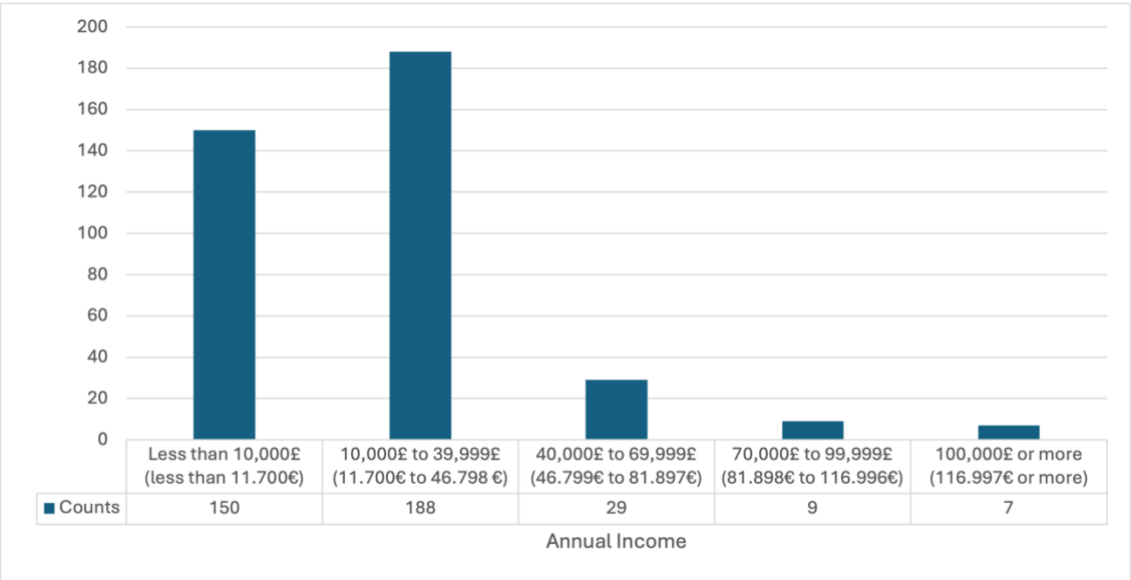


Figure 4. Sample annual income distribution

4.2 Descriptive Statistics

This section presents an overview of respondents' fashion preferences and responses to Likert-scale items, using descriptive statistics to highlight key trends and insights.

Fashion Categories and Purchase Frequency. High-street fashion emerged as the most popular shopping preference among respondents (51.4%), followed by fast fashion (40.6%). Luxury fashion was less commonly chosen and preferred by only 7.0% of respondents.

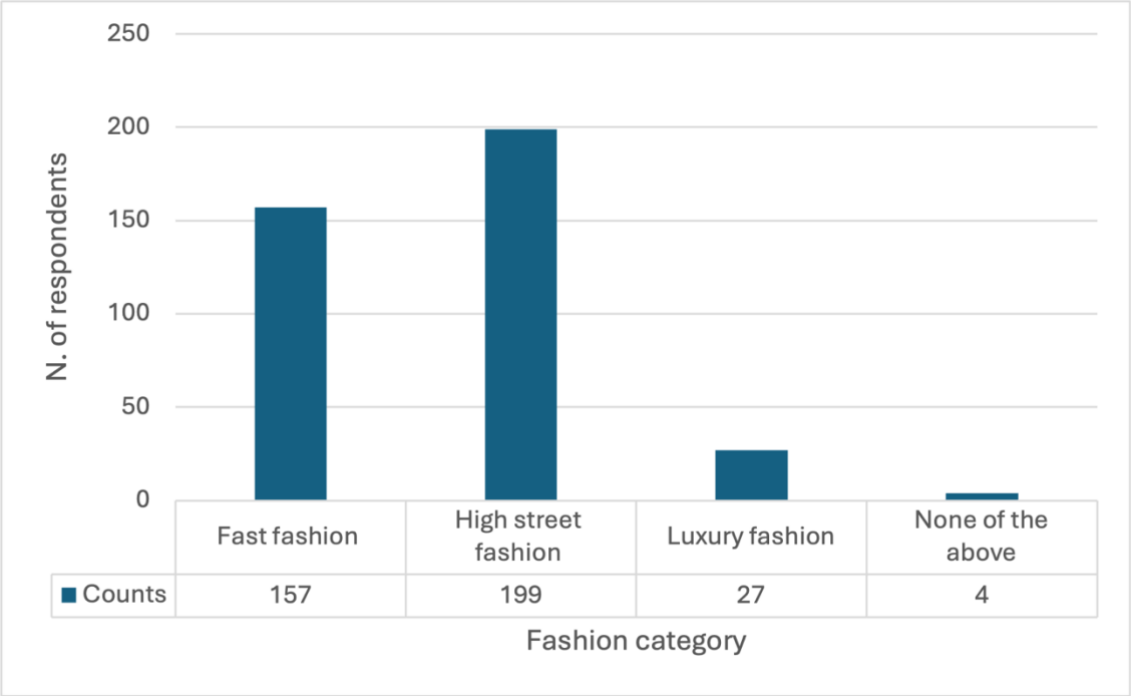


Figure 5. Fashion category preferences over the last six months

In terms of purchase frequency over the past six months, 40.5% of respondents bought 1-4 fashion items, while 32.6% purchased 5-9 items. A smaller group (5.2%) reported buying more than 20 items.

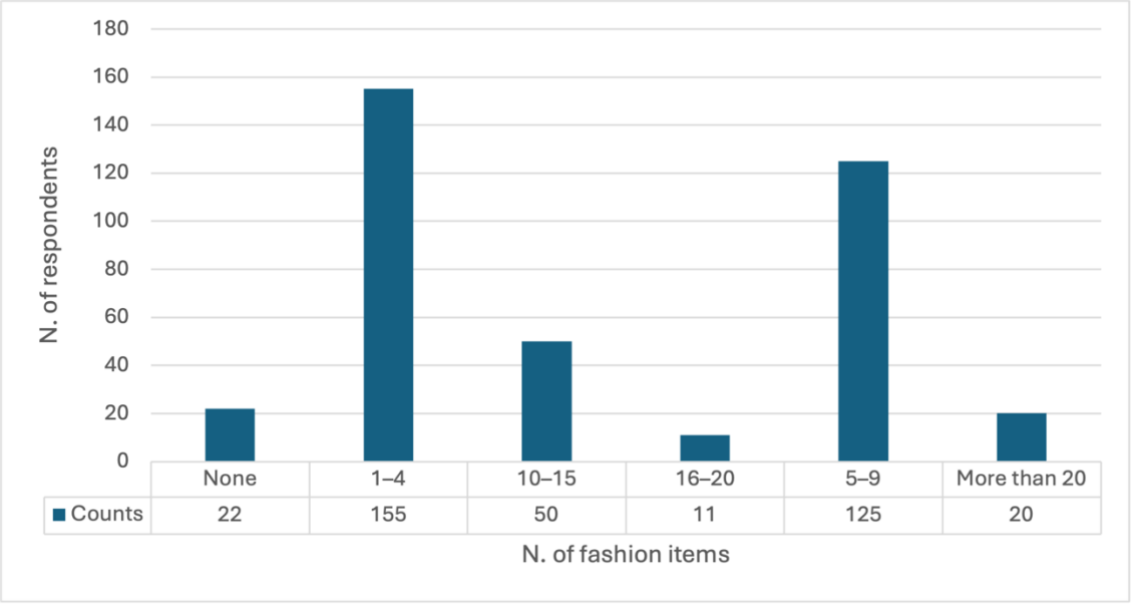


Figure 6. Number of fashion items bought in the last six months

Most respondents (38.1%) reported keeping fashion items for five years or more, indicating a strong preference for long-term use. This was closely followed by 35.2% of respondents who keep items for 3–4 years. Together, these two categories represent 73.3% of the total responses, indicating a strong preference for extended use of fashion items.

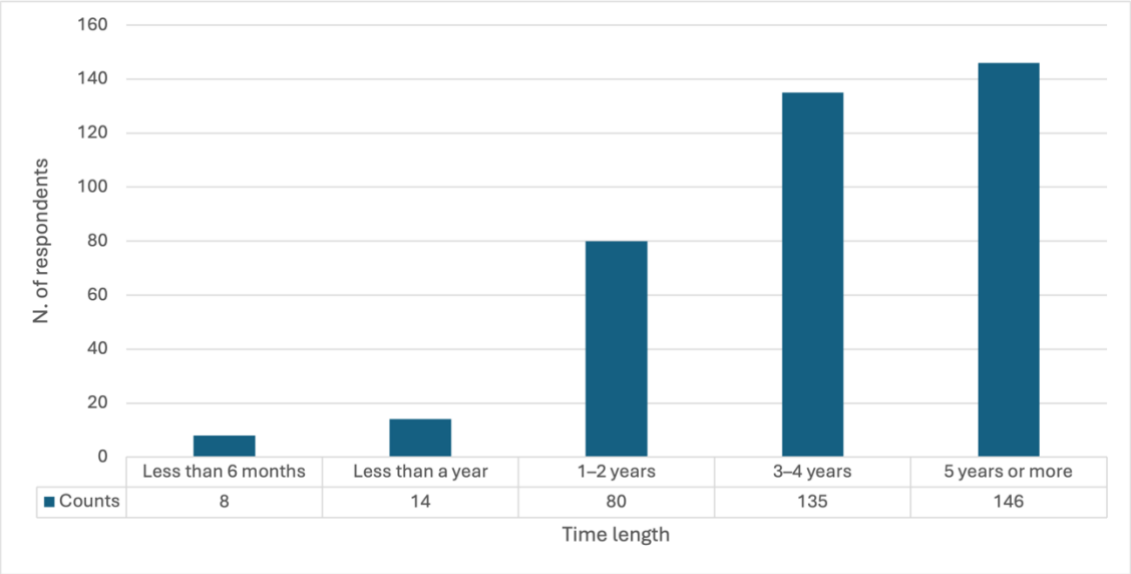


Figure 7. Fashion Item Retention Periods Reported by Respondents

Shopping Experience Factors. A smaller yet notable portion of respondents (20.9%) stated that they keep fashion items for 1–2 years. Even though it indicates a shorter retention period than the ones highlighted before, it still emphasizes the importance of durability and lasting value in fashion purchases. Only a minority reported discarding fashion items within less than a year (3.7%) or less than six months (2.1%).

Table 1. Influencing factors in shopping experience

Please rate by importance how much the following aspects influence your shopping experience in terms of fashion:	Mean	Median	SD	CV (%)
Channel choice (physical store, e-commerce)	4.96	5	1.55	31.25
Convenience	5.42	6	1.35	24.90
Entertainment	3.68	4	1.65	44.84
Social Interactions	3.77	4	1.70	45.10

The data highlights several key factors that influence the shopping experience in the fashion industry, with convenience and channel choice emerging as the most critical aspects.

Convenience is rated the highest, emphasizing that ease of shopping, whether through quick transactions, easy navigation, or accessibility, is significant for consumers. For this reason, fashion retailers should ensure that the shopping process is as effortless as possible for their customers.

Channel choice also plays a relevant role. The high mean score indicates that consumers value the availability of both physical and online shopping options.

In contrast, **entertainment** and **social interactions** are rated lower in importance. From the answers collected, we can affirm that for some consumers, entertainment and social elements enhance the shopping experience, while for others, these factors are less critical.

Table 2. Affordability vs Style

	Mean	SD	CV (%)
How important is affordability in your decision to buy fashion products?	8.05	1.75	21.74
How important is style in your decision to buy fashion products?	7.94	1.86	23.42

The findings indicate that both affordability and style are important factors influencing consumers' decisions to purchase fashion products.

Affordability has a slightly higher mean score (8.05) than style (7.94), emphasizing that price considerations are marginally more critical for consumers when deciding on fashion purchases. This insight suggests that fashion brands should prioritize competitive pricing strategies to attract and retain cost-conscious customers.

Style also plays a crucial role, with a mean score just below that of affordability. The higher variability in responses for style suggests that while it is generally important, individual preferences for style may vary more widely than those for affordability.

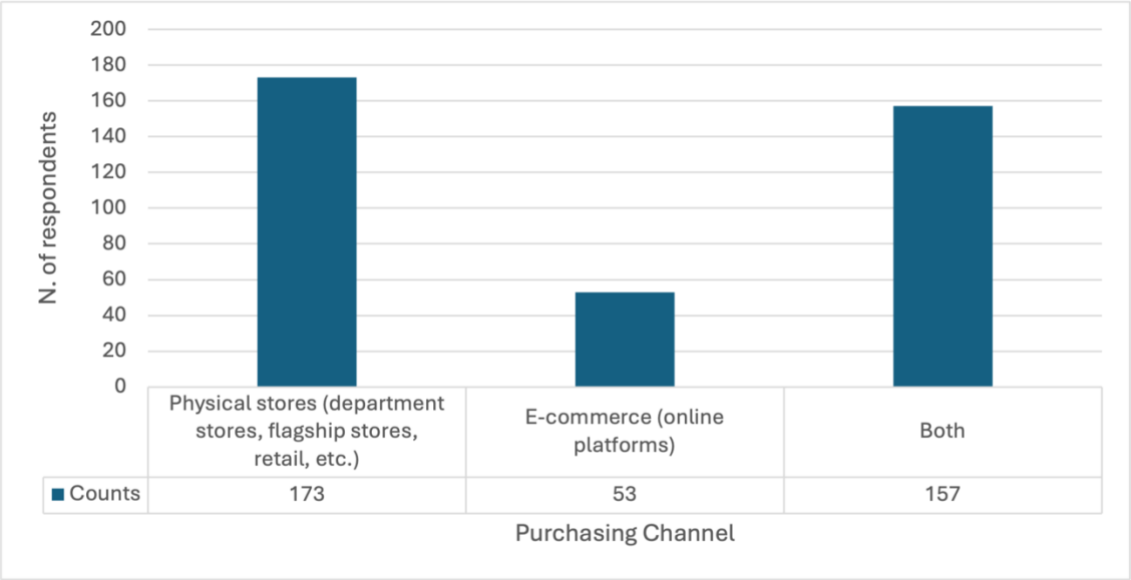


Figure 8. Preferred Channel for purchasing fashion items

The data reveals a varied set of consumer preferences for shopping channels in the fashion industry. The largest proportion (45.2%) favours physical stores, followed closely by 41.0% who prefer a combination of physical and online shopping, reflecting an increasing trend towards omnichannel retailing. A smaller segment, comprising 13.8% of respondents, exclusively prefers e-commerce platforms for purchasing fashion items.

Social media engagement. The data indicates that a slight majority of respondents (53.8%) do not follow fashion brands on social media. In contrast, 46.2% do, suggesting that a significant portion of the sample recognizes the value of engaging with fashion brands through social media platforms.

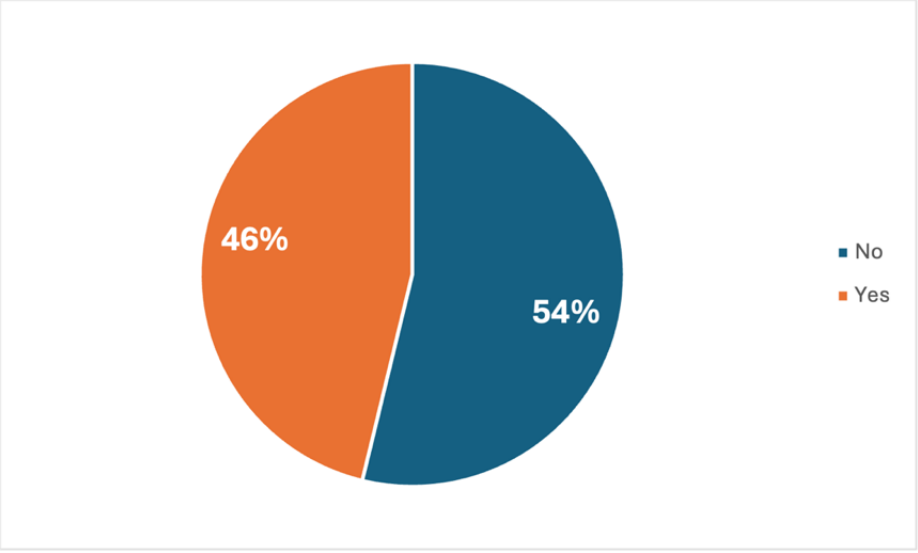


Figure 9. Percentage of Respondents Following Fashion Brands on Social Media

Nearly half of the respondents (48.3%) reported not making purchases influenced by social media advertisements. In contrast, a slight majority (51.7%) indicated that they made purchases prompted by social media advertisements from fashion brands.

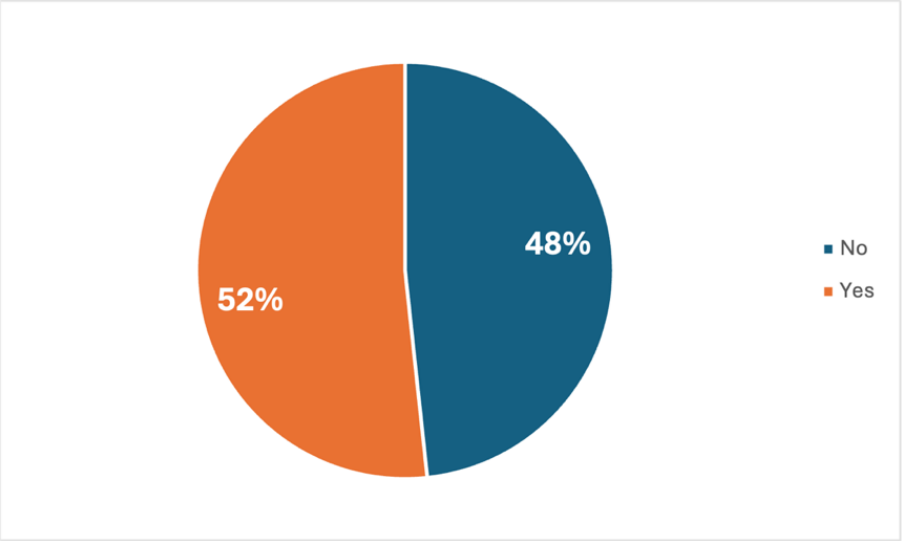


Figure 10. Impact of Social Media Advertisements on Respondents' Fashion Purchases

Blockchain technology's role perception. The findings indicate a generally neutral perception of blockchain technology's role in transforming the fashion industry. High mean scores across all statements reflect strong agreement on blockchain's potential benefits, such as improved transparency, consumer trust and data accuracy, reduced counterfeit risks, and automated transactions.

Table 3. Blockchain level of awareness and understanding

Please indicate the extent to which you agree with the following statements.	Mean	Median	SD	CV (%)
Blockchain technology will improve the transparency in the fashion supply chain.	4.32	4	1.41	32.64
Blockchain technology will increase the trust the consumer has toward a particular fashion brand.	4.34	4	1.43	32.95
Blockchain technology will increase data accuracy in terms of traceability of materials and products in the fashion industry.	4.65	5	1.44	30.97
Blockchain technology will reduce the risk of buying counterfeit products in the fashion industry.	4.48	4	1.53	34.15
Blockchain technology will automate actions and transactions between parties.	4.61	5	1.25	27.11

The survey results reveal generally positive perceptions of blockchain technology's impact on the fashion industry.

In detail, respondents believe that blockchain will improve transparency in the fashion supply chain, with a mean score of 4.32. Conversely, the standard deviation of 1.41 indicates some variability in opinions, showing that while many agree, some are less convinced.

Regarding consumer trust, the mean score of 4.34 suggests a strong belief in blockchain's potential to enhance trust in fashion brands. The standard deviation of 1.43 reflects a similar level of variation, highlighting differing degrees of agreement among respondents.

The highest mean score of 4.65 resulted from the statement on improving data accuracy and traceability, suggesting strong support for this benefit. However, the standard deviation of 1.44 shows that not all respondents felt equally strongly about it.

For reducing counterfeit products, the mean score was 4.48, indicating a positive outlook. However, the higher standard deviation of 1.53 suggests a broader range of opinions.

Finally, the automation of actions and transactions received a mean score of 4.61, with the lowest standard deviation of 1.25, indicating a more consistent agreement among respondents.

Table 4. Fashion brands' blockchain adoption – Purchase Intention

If a fashion brand has adopted blockchain technology,	**Mean**	**Median**	**SD**	**CV (%)**
If a fashion brand has adopted blockchain technology, I would like to purchase fashion items from that brand.	4.54	5	1.32	29.07
If a fashion brand has adopted blockchain technology, I would like to repeat my experience in purchasing fashion items from that brand.	4.52	5	1.25	27.65
If a fashion brand has adopted blockchain technology, I will execute my next purchase from	4.15	4	1.37	33.01

that fashion brand because it uses blockchain technology to track its production process.				
If a fashion brand has adopted blockchain technology, I am inclined to purchase fashion items from that brand.	4.35	4	1.38	31.72

The integration of blockchain technology by fashion brands seems to have a positive effect on consumer purchasing intentions and behaviours. This influence is evident in the following key findings:

1. *Interest in Purchasing.* With a mean rating of 4.54 and a standard deviation of 1.32, respondents generally show strong interest in purchasing from brands that use blockchain technology. While the overall sentiment is positive, the variation in responses indicates some differing opinions.
2. *Willingness to Repeat Purchases.* The mean rating of 4.52, with a standard deviation of 1.25, shows that respondents are likely to make repeat purchases from these brands. Again, the responses are mostly positive but exhibit some variation.
3. *Influence on Next Purchase.* The mean rating of 4.15 and a standard deviation of 1.37 indicate that blockchain technology somewhat influences the decision for the next purchase. Although the average response is favourable, there is a broader range of opinions here.
4. *Overall Inclination to Purchase.* With a mean of 4.35 and a standard deviation of 1.38, respondents generally feel inclined to purchase from these brands. The range of responses indicates that while many consumers are enthusiastic, others show varying degrees of interest.

Table 5. Fashion brands' blockchain adoption – Shopping Experience Satisfaction

If the fashion brand you're buying products from has adopted blockchain technology,	**Mean**	**Median**	**SD**	**CV (%)**
I would be entirely satisfied with using blockchain technology applications during my shopping experience.	4.43	5	1.44	32.50

If a fashion brand has adopted blockchain technology, I would like to repeat my experience in purchasing fashion items from that brand.	4.30	4	1.30	30.23
Blockchain technology application usage is an ideal fashion retail technology.	4.46	5	1.33	29.82

The findings highlight a positive perception of blockchain technology applications in the fashion retail sector. The high mean scores across all statements reflect a consensus that could be defined as general on the benefits and satisfaction associated with blockchain technology.

The statement regarding satisfaction with blockchain technology during shopping experiences underscores a high level of consumer approval, with a mean score of 4.43. This suggests that consumers are likely to be pleased with the integration of blockchain technology in their shopping processes.

The statement about benefits exceeding expectations, with a mean score of 4.30, indicates that respondents believe blockchain technology not only meets but can exceed their expectations, enhancing their overall shopping experience.

Lastly, the highest mean score of 4.46 for the statement on blockchain technology being an ideal fashion retail technology suggests a strong belief in the suitability and potential of blockchain for revolutionizing the fashion retail industry.

4.3 Inferential statistics

This study employs inferential statistics to explore potential associations among various aspects. First, chi-square analysis is discussed, followed by multiple linear regression analysis and the analysis of variance (ANOVA).

4.3.1 Chi-Square Analysis

A chi-square analysis was conducted to ascertain whether a significant relationship exists between gender and dominant shopping preferences. The analysis was performed at a 95% confidence level, with an alpha (α) of 0.05, indicating a 5% threshold for determining statistical significance.

Figure 11 shows no significant association between gender and shopping preference, $\chi^2(4, N = 383) = 6.02$, $p = 0.198$. Among females, 42.2% preferred fast fashion, while 51.6% favoured high-street fashion. Males showed similar preferences, with 39.8% choosing fast fashion and 50.0% choosing high-street fashion. Both genders showed lower preferences for luxury fashion, with only 6.1% of females and 10.2% of males selecting this category. This suggests that gender does not significantly influence shopping preferences in this sample.

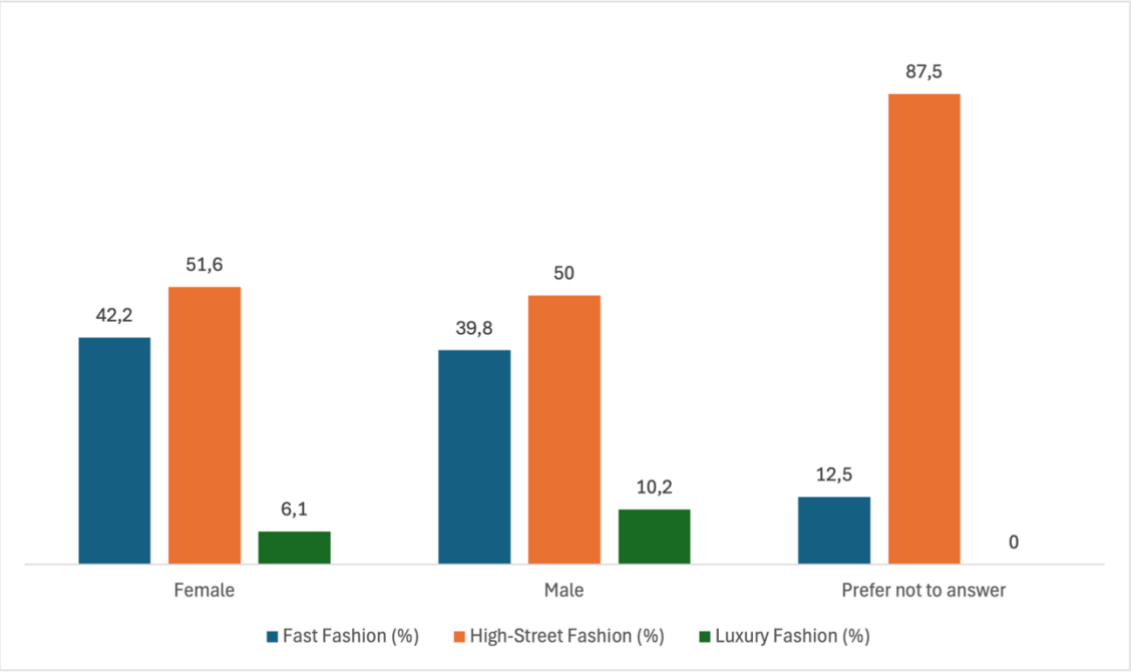


Figure 11. Gender-Based Distribution of Fashion Shopping Preferences

A significant association was found between age and shopping preference, $\chi^2(10, N = 383) = 21.6$, $p = 0.017$. Younger respondents (18-24 years) predominantly preferred fast fashion (46.5%) and high-street fashion (49.0%), as shown in Fig.12. In contrast, luxury fashion preferences were more evenly distributed across all age groups, with the highest interest observed among respondents aged 35-44 (16.1%).

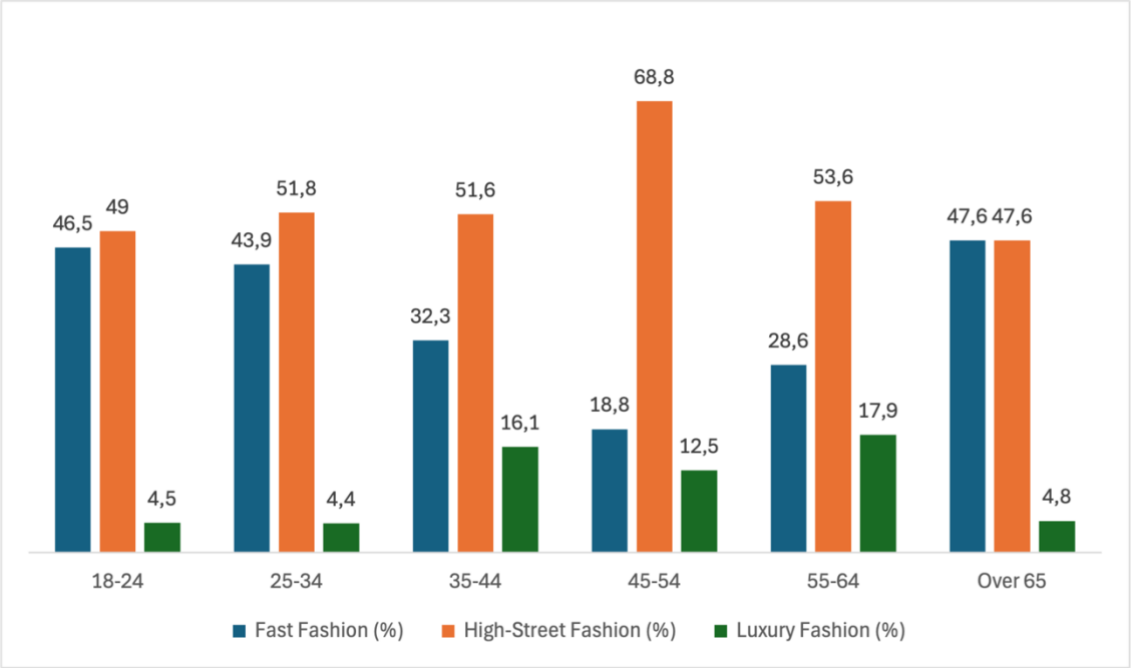


Figure 12. Age-Based Distribution of Shopping Preferences

No significant association was observed between annual income and shopping preference, $\chi^2(25, N = 383) = 23.3$, $p = 0.559$. As evident from Figure 13, fast fashion was most popular among respondents earning less than £10,000 (€11,700), while high-street fashion was preferred across multiple income groups. Respondents with incomes above £100,000 (€116,997) did not exhibit a strong preference for any specific shopping category.

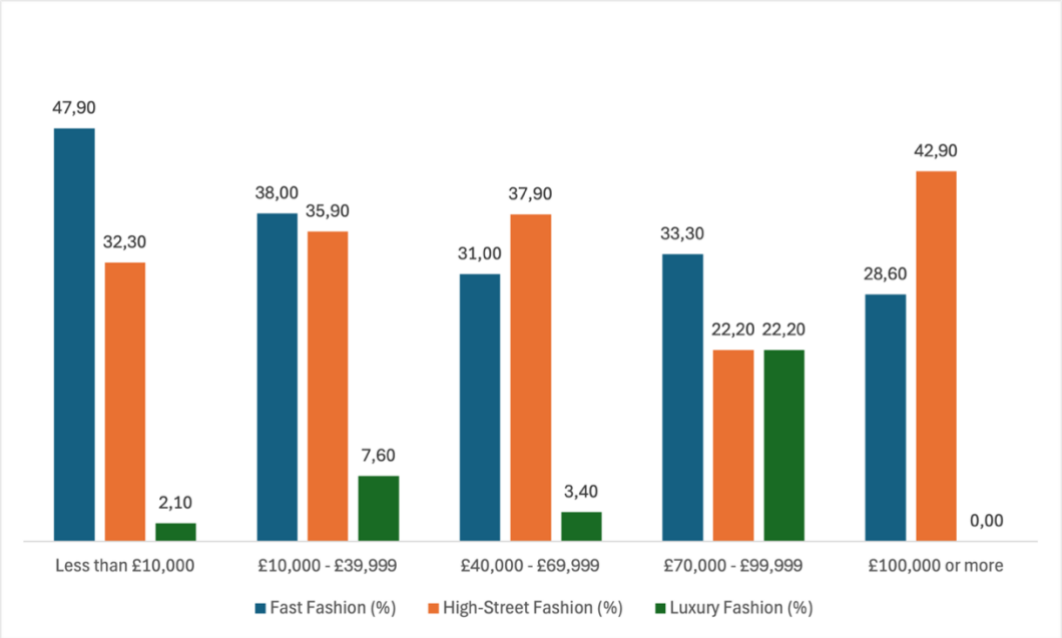


Figure 13. Distribution of Shopping Preferences Across Annual Income Levels

The chi-square test showed no significant association between employment status and shopping preference, $\chi^2(8, N = 383) = 14.6$, $p = 0.068$. Students represented the largest group preferring fast fashion (47.5%) and high street fashion (48.0%). Luxury fashion was more popular among the self-employed (17.2%).

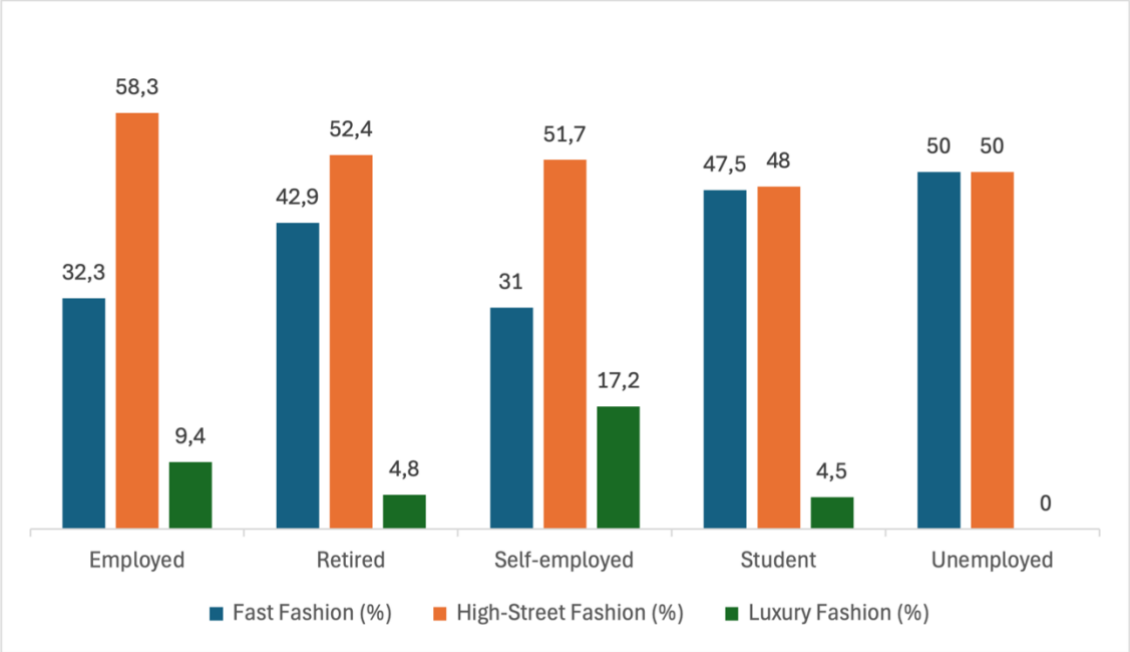


Figure 14. Distribution of Shopping Preferences Across Employment Status

The analysis revealed no significant association between the number of fashion items bought and shopping preference, $\chi^2(10, N = 383) = 9.29$, $p = 0.505$. Most respondents, regardless of their shopping preference, bought between 1-4 fashion items in the past six months.

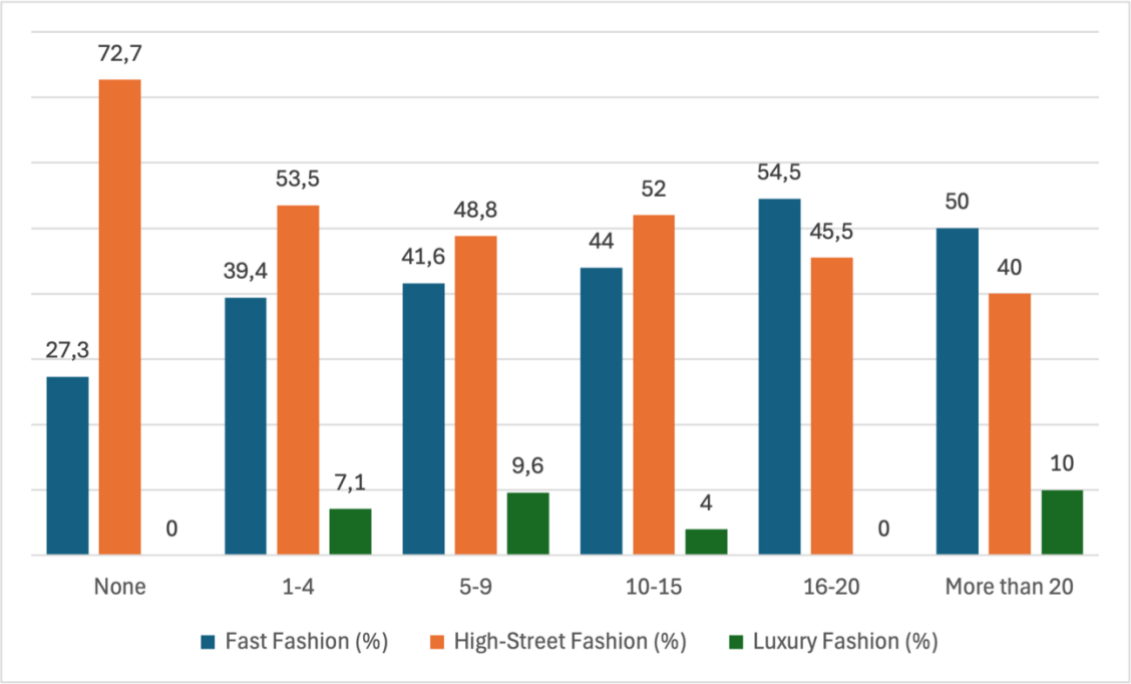


Figure 15. Distribution of Fashion Items Bought Across Shopping Preferences

A significant association emerged between the duration of keeping fashion items and shopping preference, $\chi^2(8, N = 383) = 20.5$, $p = 0.009$. Respondents who kept items for 5 years or more were more likely to prefer high-street fashion (63.0%) and luxury fashion (48.1%), while those who kept items for 1-2 years showed a stronger preference for fast fashion (56.3%), as shown in Figure 16.



Figure 16. Association Between Item Retention Duration and Shopping Preference

A notable association was observed between the duration of keeping fashion items and age group, $\chi^2(20, N = 383) = 28.8$, $p = 0.092$. While the relationship does not reach conventional statistical significance ($p > 0.05$), clear trends emerge regarding how different age groups approach fashion item retention. Younger respondents (18-34 years) were more likely to discard fashion items within 1-2 years or 3-4 years, with 18-24-year-olds (22.9%) and 25-34-year-olds (19.1%) showing the highest proportion of short-term retention. In contrast, older respondents (45 and above) demonstrated a greater tendency to keep fashion items for 5 years or more, particularly among those aged 55-64 (60.7%) and over 65 (57.1%).

Furthermore, a small but noticeable segment of younger respondents reported discarding fashion items within less than 6 months or less than a year, suggesting a higher engagement with fast fashion and shorter product life cycles in this demographic. These results highlight how age influences fashion consumption behaviours, with younger consumers showing a higher turnover rate while older groups tend to prioritize longevity in their wardrobe choices.

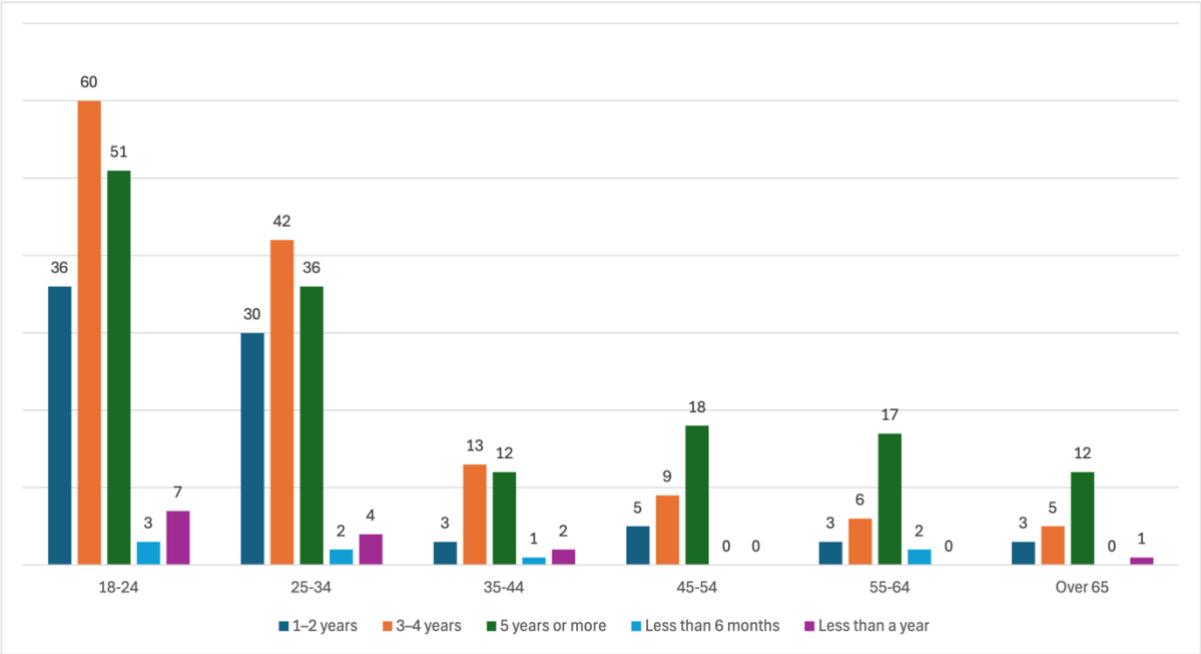


Figure 17. Association Between Item Retention Duration and Age Group

A statistically significant association was found between the duration of keeping fashion items and gender, $\chi^2(8, N = 383) = 15.5$, $p = 0.05$. The results suggest that women tend to retain fashion items for longer durations compared to men.

Women were more likely to keep fashion items for 5 years or more (41.9%) compared to men (27.6%).

In contrast, men were more likely to discard items within 1-2 years (30.6%) or 3-4 years (31.6%) than women, who were more likely to keep them for a longer period.

A small but notable proportion of respondents who preferred not to disclose their gender exhibited similar patterns to men, with a slight inclination toward long-term retention.

Short-term disposal (less than 6 months or less than a year) was relatively low across all gender groups but marginally higher among men and women compared to those who preferred not to answer.

These findings highlight that gender plays a role in fashion consumption behaviours. Women exhibit stronger tendencies toward long-term retention, while men show a preference for shorter cycles of fashion item use.

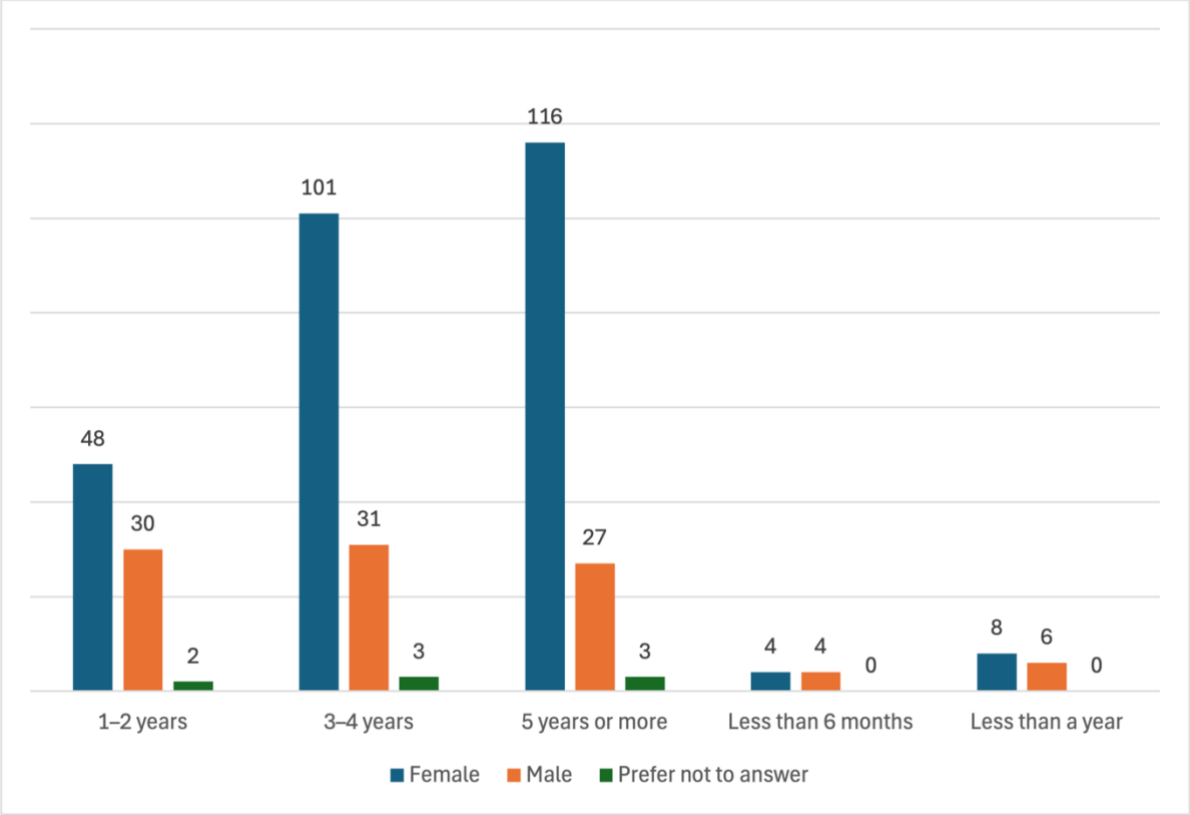


Figure 18. Association Between Item Retention Duration and Gender

A significant association was found between the duration of keeping fashion items and employment status, $\chi^2(16, N = 383) = 30.9$, $p = 0.014$. This suggests that employment status plays a role in determining how long individuals retain their fashion items before discarding them.

Students showed the highest likelihood of discarding fashion items within 1-2 years (24.0%) or 3-4 years (38.5%), indicating a tendency toward faster fashion consumption cycles. However, a significant portion

(32.0%) also reported keeping items for 5 years or more, highlighting a potential divide in fashion retention habits among students.

Employed individuals were more evenly distributed, with a substantial proportion keeping items for 5 years or more (45.7%), but many also discarding them within 3-4 years (34.6%).

Retired individuals (61.9%) and self-employed individuals (24.1%) had the highest retention rates for 5 years or more, showing a stronger preference for long-term fashion use.

Short-term disposal (less than 6 months or less than a year) was minimal across all employment groups but was slightly more common among students and self-employed individuals.

These findings indicate that employment status influences fashion retention behaviour, with students and younger professionals exhibiting faster turnover rates, while retired and self-employed individuals tend to keep their fashion items for longer durations.

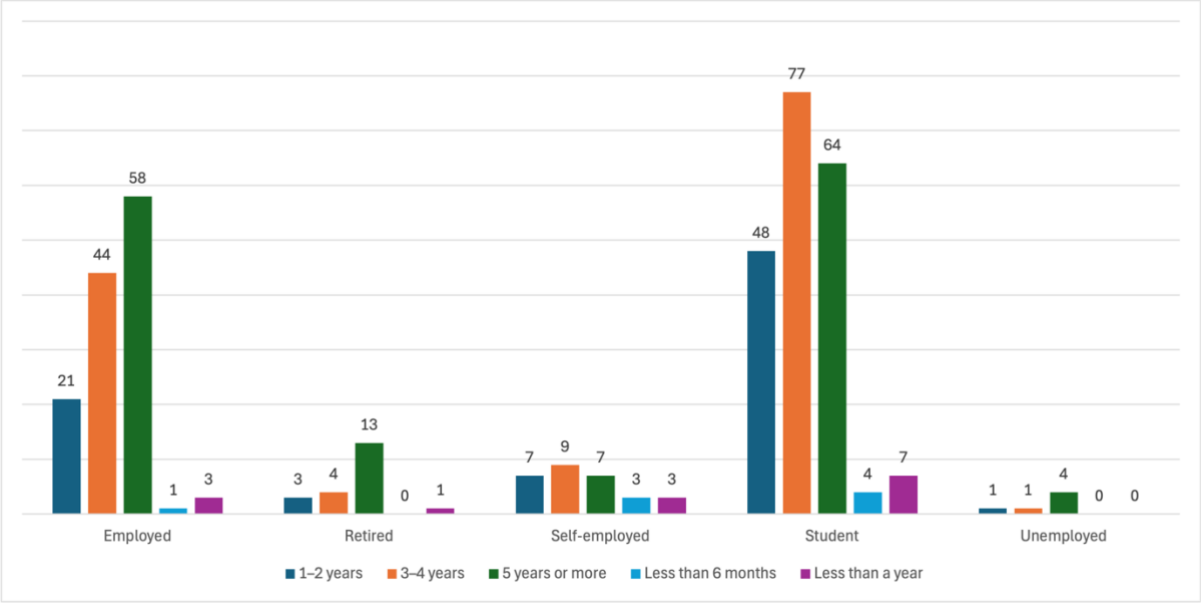


Figure 19. Association Between Item Retention Duration and Employment Status

No significant association was found between the duration of keeping fashion items and income level, $\chi^2(20, N = 383) = 17.2$, $p = 0.642$. This suggests that income does not play a decisive role in how long individuals retain fashion items before discarding them.

However, some trends emerge in the data:

Individuals in the lower income brackets (<£10,000 and £10,000-£39,999) exhibit a more diverse range of retention behaviours, with a notable portion discarding items within 1-2 years (31.0% and 42.0%) or 3-4 years

(60.0% and 59.0%). Still, a significant share of respondents in these groups retain items for 5 years or more (48.0% and 78.0%, respectively).

In the higher income brackets (£40,000 and above), respondents also show varied behaviours, but the sample sizes are smaller. Individuals earning £40,000-£69,999 were the most likely to keep items for 5+ years (13.0%), while those in £100,000+ brackets were divided between long-term retention and shorter cycles.

Short-term disposal (less than 6 months or less than a year) remains relatively low across all income levels, suggesting that fashion item retention behaviour is not strongly dependent on financial capability.

These findings indicate that income level does not significantly dictate fashion retention habits, as individuals across different income groups exhibit similar tendencies toward both short-term and long-term retention.

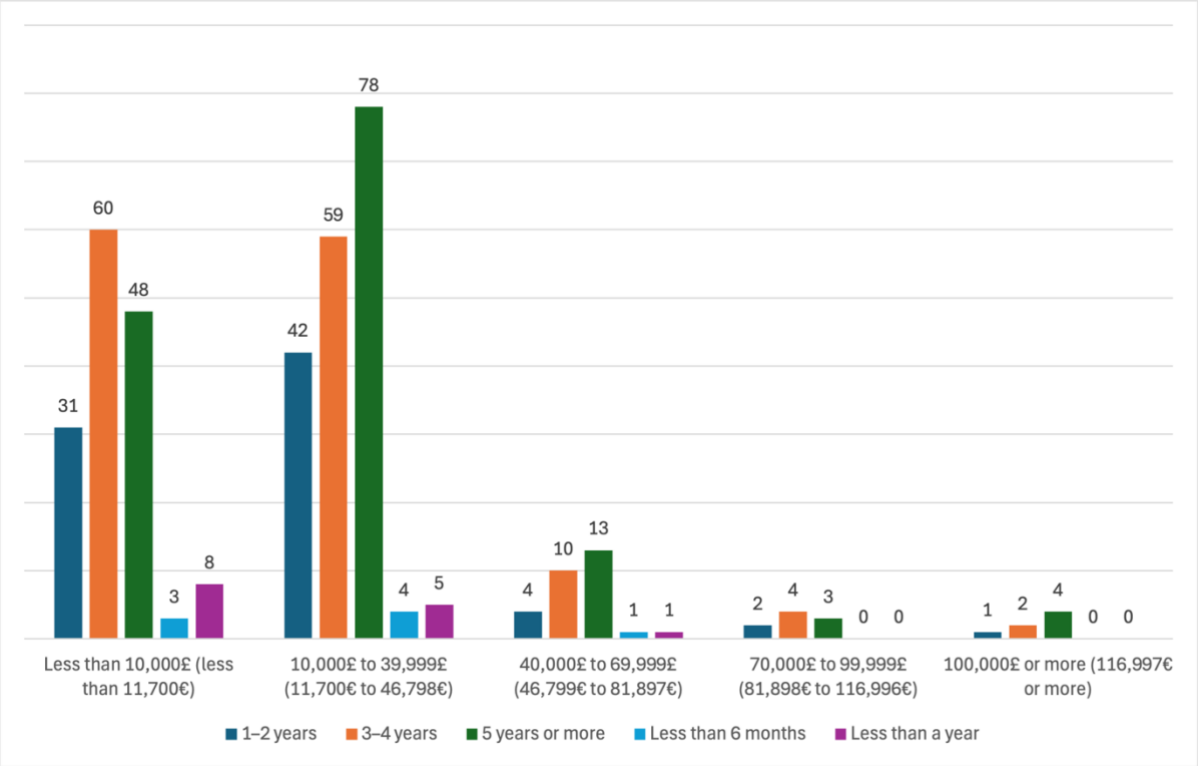


Figure 20. Association Between Item Retention Duration and Annual Income

4.3.2 Multiple Linear Regression Analysis

A multiple linear regression analysis was conducted to assess the impact of consumers' perceptions of blockchain technology on their purchase intentions in the fashion industry. The model was significant, $F(5, 377) = 40.9$, $p < .001$, indicating that the selected predictors explained substantial variation in purchase intent.

Model fit statistics included an R value of 0.593, showing a moderate correlation between the predictors and purchase intent. An R^2 of 0.352 indicated that 35.2% of the variance in purchase intent is explained by the model, with an adjusted R^2 of 0.343 confirming the model's robustness. AIC (1078) and BIC (1106) values, along with an RMSE of 0.971, further validated the model's fit.

Predictors of Purchase Intent. The regression analysis revealed specific predictors of purchase intent based on consumers' perceptions of blockchain technology:

- **Transparency in the Fashion Supply Chain**: A significant predictor of purchase intent (Estimate = 0.1791, p = 0.006), indicating that consumers who believe blockchain enhances transparency are more likely to have increased purchase intentions. This emphasizes transparency as a critical factor, likely due to ethical concerns in fashion.
- **Consumer Trust Towards a Brand**: Another significant predictor (Estimate = 0.1581, p = 0.011), showing that blockchain's potential to boost trust can positively influence purchase intent. This finding suggests that brands using blockchain may enhance their credibility and appeal to consumers.
- **Data Accuracy and Traceability**: This factor did not significantly influence purchase intent (Estimate = 0.0544, p = 0.380), suggesting that while accuracy and traceability are valued, they may not be as immediately persuasive for consumers as transparency and trust.
- **Risk of Buying Counterfeit Products**: Significantly predicted higher purchase intent (Estimate = 0.1569, p = 0.002), suggesting that consumers appreciate blockchain's potential to verify product authenticity, addressing a key concern in the fashion industry.
- **Automation of Actions and Transactions**: This predictor did not significantly impact purchase intent (Estimate = 0.0161, p = 0.756), indicating that automation, although beneficial, may not be a primary factor in consumers' purchasing decisions.

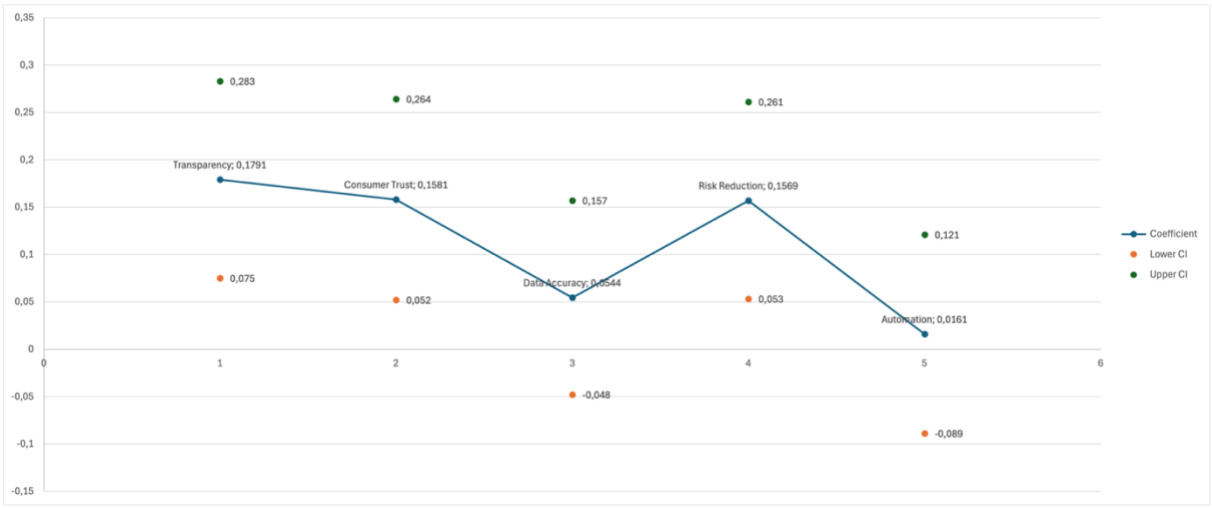


Figure 21. Predictors of Purchase Intent: Coefficients and Confidence Intervals

4.3.3 Analysis of Variance (ANOVA)

Within-Subjects Effects. The Repeated Measures ANOVA results highlight significant differences in how various factors influence consumers' shopping experiences, particularly regarding sustainability and emerging technologies. The ANOVA identified notable differences in the importance attributed to shopping experience factors, with a significant effect ($F = 179$, $p < .001$). This finding was consistent across the Greenhouse-Geisser and Huynh-Feldt corrections ($F = 179$, $p < .001$), applied due to a violation of the sphericity assumption indicated by Mauchly's test ($W = 0.528$, $p < .001$).

Between-Subjects Effects. The analysis indicated a residual sum of squares of 1916 with 382 degrees of freedom and a mean square of 5.02. Although specific p-values were not provided, these values reflect the robustness of the between-subjects findings.

Post Hoc Tests. Post hoc comparisons further clarified the importance consumers place on different shopping experience factors. "Channel Choice" was rated significantly lower than "Convenience" ($t = -6.92$, $p < .001$) but higher than "Entertainment" ($t = 12.19$, $p < .001$) and "Social Interactions" ($t = 11.03$, $p < .001$). Additionally, "Convenience" was rated significantly higher than both "Entertainment" ($t = 18.51$, $p < .001$) and "Social Interactions" ($t = 16.50$, $p < .001$), underscoring the varying levels of importance attributed to each factor.

Estimated Marginal Means. The estimated marginal means provided further insight into these differences. "Convenience" was rated as the most important aspect ($M = 5.42$), followed by "Channel Choice" ($M = 4.96$).

"Entertainment" and "Social Interactions" received lower mean ratings (M = 3.68 and M = 3.77, respectively). These findings suggest that while each factor is valued, consumers prioritise convenience above all else in their shopping experiences.

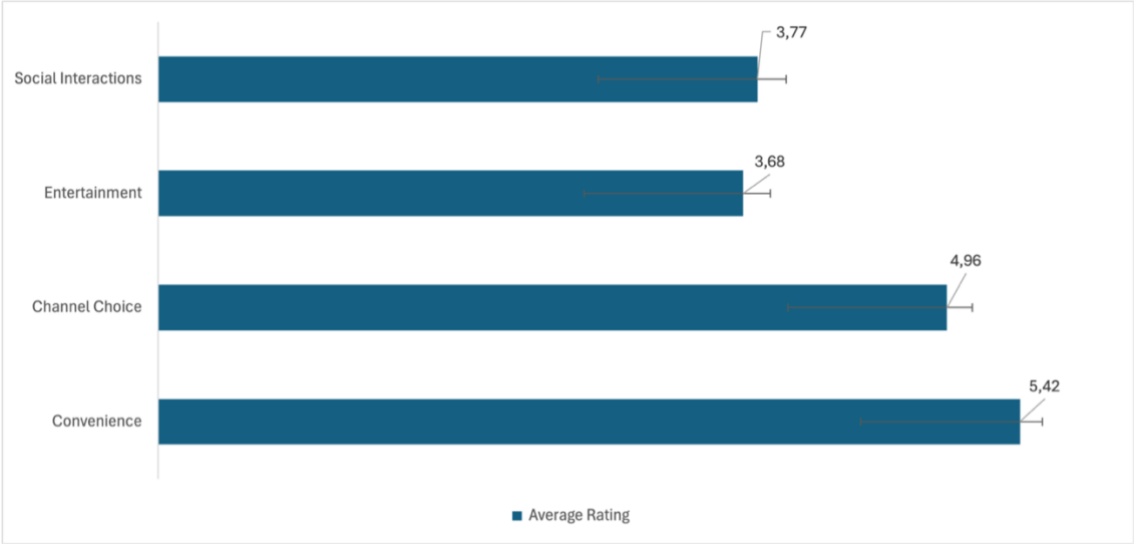


Figure 22. Shopping Experience Aspects Based on Estimated Marginal Means

5. Discussion

The findings highlight the interplay between consumer preferences and behaviour in the fashion industry. This industry is shaped by tensions reflecting societal and market dynamics. Rather than obstacles, these tensions can be seen as opportunities for brands to balance competing priorities and adapt to changing demands.

This aligns with paradox theory (Smith & Lewis, 2011), which posits that contradictions like sustainability vs. affordability are not mutually exclusive but interdependent, requiring dynamic strategies to harmonise them.

5.1 Consumer Priorities: Affordability, Sustainability, and the Paradox of Intention

The results highlight the centrality of affordability in consumer decision-making, slightly exceeding style (mean = 8.05 vs. 7.94). Affordability remains the main factor in the decision-making process, closely followed by style. The attractiveness of fast fashion in terms of cost contrasts with the growing consumer preference for durability and sustainable consumption. This mirrors the "attitude-behaviour gap" (Mandarić et al., 2022), and it correlates with the economic realities of the analysed sample, reinforcing price sensitivity as a primary factor in markets dominated by fast fashion (Bhardwaj & Fairhurst, 2010). Furthermore, this duality illustrates the tension between sustainability aspirations and pragmatic consumption habits, as theorised in the gap between intentions and behaviour (Carrington et al., 2014). Price and availability barriers have further worsened this gap, supporting H3 and highlighting systemic challenges in scaling sustainable fashion (Kozar & Hiller Connell, 2013).

H1 (Sustainability Awareness and Preferences): Supported with limitations. Consumers informed about sustainability issues showed a preference for brands with sustainable practices, aligning with prior research (Mandarić et al., 2022). However, the gap between awareness and action persists, particularly among younger, price-sensitive demographics.

H3 (Barriers to Sustainable Fashion): Supported. Price and availability were cited as primary barriers, consistent with studies highlighting the accessibility challenges of sustainable fashion (Kozar & Hiller Connell, 2013).

H10 (Willingness to Pay for Sustainability): Partially supported. While some consumers expressed willingness to pay a premium for sustainable products, this was contingent on affordability, particularly among lower-income groups.

5.2 Omnichannel Strategies, Convenience and Flexibility

The retail landscape is increasingly characterised by omnichannel strategies, which combines the tactile and social appeal of physical shops with the convenience and accessibility of online platforms, fulfilling different

consumer expectations. Examples of this can be found in post-pandemic trends like BOPIS (Buy Online, Pick Up In-Store).

Convenience emerged as the primary factor shaping shopping experiences (mean = 5.42), surpassing channel choice (mean = 4.96), entertainment, and social interactions. These findings validate H9 and emphasise the necessity for frictionless, flexible retail models (Gwozdz et al., 2017). However, the subdued role of entertainment and social interactions implies that experiential marketing—often hailed as essential in digital retail—may need recalibrating to align with consumer priorities.

H9 (Omnichannel Preferences): Supported. Consumers valuing omnichannel experiences prioritized convenience and flexibility, underscoring the importance of integrated retail strategies (Gwozdz et al., 2017).

5.3 Technological Perceptions: Blockchain's Potential and Pragmatic Limits

Emerging technologies such as blockchain can improve transparency and trust but have a limited direct impact on purchase decisions. In detail, consumers regarded blockchain favourably for enhancing supply chain transparency (mean = 4.32) and mitigating counterfeit risks (mean = 4.48), supporting H7 and H8. However, its direct impact on purchase intent remained neutral, highlighting a disconnect between ethical assurance and actionable trust. This correlates with studies suggesting that technological novelty alone cannot surpass foundational motivators such as affordability (Saberi et al., 2019).

H7 (Blockchain and Shopping Experience): Supported. Blockchain adoption enhanced perceptions of transparency and trust, though its impact on purchase intent was indirect, emphasizing the need for clear consumer benefits.

H8 (Blockchain and Trust): Supported. Blockchain's potential to address ethical concerns (e.g., counterfeit reduction) strengthened trust, aligning with studies on technology's role in bridging trust gaps (Saberi et al., 2019).

5.4 Demographic Nuances: Income, Generational Divides, and Ethical Trade-Offs

Higher-income respondents demonstrated stronger inclinations towards sustainability (H2 partially supported), yet income did not significantly influence purchasing patterns, as affordability constraints affected all cohorts. Generational divides further complicated this dynamic: younger consumers (Gen Z and Millennials) exhibited increased ethical awareness (H5 supported) but disproportionately preferred fast fashion, due to financial barriers, unlike older generations. This reflects the dissonance between aspirational values and economic realities (Niinimäki et al., 2020). Gender and education displayed limited impact on sustainability priorities (H6 partially supported), suggesting that ethical consumption is shaped by a complex interplay of cultural, economic, and psychological factors beyond mere demographics.

H2 (Income and Sustainable Purchases): Partially supported. While higher-income respondents exhibited greater interest in sustainable fashion, affordability remained a barrier for the majority, reinforcing the price-sustainability trade-off (Mandarić et al., 2022).

H5 (Generational Awareness): Supported. Younger consumers (Gen Z and Millennials) demonstrated greater sustainability awareness, though their purchasing behaviour often prioritized affordability and trends, reflecting the intention-behaviour gap (Carrington et al., 2014).

H6 (Demographic Influences): Partially supported. While age and income influenced sustainability priorities, gender and education showed weaker associations, highlighting the complexity of demographic factors in shaping ethical consumption.

5.5 Social Media Engagement vs. Influence

Social media proves more impactful for visibility than direct purchases. While 46.2% of consumers follow fashion brands on social media, only 51.7% report ad-influenced purchases. This disparity highlights social media's role as a platform for brand awareness rather than conversion of direct sales. For instance, #HaulCulture videos on TikTok—where influencers showcase bulk purchases of fast-fashion items (i.e., Shein) —drive significant engagement (Fong et al., 2022). However, this visibility often prioritises quantity over sustainability, contrasting with campaigns that leverage social media to promote mindful consumption.

The key is aligning influencer partnerships with verifiable actions. SHEIN's affiliate and ambassador programs, which incentivize micro-influencers to post haul videos in exchange for free products or commissions, exemplify how brands harness peer-driven trust (Fong et al., 2022). Conversely, initiatives like Gucci's "Off the Grid" line use Instagram to showcase blockchain-tracked supply chains, merging visibility with accountability.

The findings indicate that brands need to create campaigns that go beyond superficial engagement. These campaigns should leverage authenticity and value alignment to bridge the gap between digital interactions and transactional intent (H4 supported but with limitations).

H4 (Sustainability Marketing): Supported, with limitations. Sustainability-focused marketing positively influenced perceptions, though its impact on purchasing behaviour was less pronounced. This suggests a need for more compelling value propositions.

In conclusion, the hypotheses can be summarised as follows:

- **H1, H3–H5**: Sustainability awareness and marketing positively shape perceptions, yet structural barriers (price, availability) and generational trade-offs (ethics vs. affordability) perpetuate the intention-behaviour gap.
- **H2, H6, H10**: Income and demographics influence attitudes but fail to override systemic affordability challenges, underscoring the need for equitable pricing strategies.
- **H7–H9**: Blockchain and omnichannel strategies enhance trust and convenience, yet their impact is secondary to core motivators like cost and style.

6. Conclusion

This study explores the complex dynamics of consumer behaviour in the fashion industry, focusing on the interplay between sustainability, affordability, and technological innovation. The findings reveal that while affordability remains the primary driver of purchasing decisions, there is a growing awareness of sustainability and cautious optimism toward emerging technologies like blockchain. These insights align with paradox

theory, which suggests that competing priorities such as sustainability and affordability are not mutually exclusive but can be harmonised through innovative strategies.

The fashion industry is at a critical point where tensions between aspects like sustainability, affordability, and technological innovation present challenges and opportunities. By implementing innovative strategies that reconcile these conflicting priorities, brands could turn contradictions into drivers of industry evolution.

In detail, affordability appears as the most critical factor influencing consumer decisions, slightly outweighing style. However, there is a latent preference for sustainable practices, particularly among younger consumers. Despite this, a significant gap exists between sustainability awareness and actual purchasing behaviour, primarily due to price and availability barriers.

Consumers increasingly value convenience and flexibility, favouring omnichannel shopping experiences that blend online and offline retail. While convenience is paramount, entertainment and social interactions play a lesser role in shaping shopping experiences.

Furthermore, emerging technologies like blockchain are viewed positively because they have the potential to enhance transparency and trust in the fashion supply chain. However, their direct impact on purchase intent is limited, suggesting that technological innovation alone cannot override core consumer motivators like cost and style.

While social media is a powerful tool for brand visibility, its influence on direct purchasing decisions is more limited. Consumers engage with brands on social platforms, but this does not always translate into sustainable purchasing behaviour. Younger generations (Gen Z and Millennials) show greater awareness of sustainability issues but are more likely to prioritize affordability and fast fashion due to financial constraints. Higher-income consumers exhibit stronger inclinations toward sustainable fashion, though affordability remains a barrier across all income levels.

6.1 Theoretical and Practical Implications

The findings contribute to paradox theory by illustrating how competing priorities in the fashion industry—such as sustainability and affordability—can coexist and be managed through dynamic strategies. For brands, this means adopting hybrid approaches that balance ethical practices with economic realities. For instance, initiatives like H&M's "Conscious Collection" and Uniqlo's "LifeWear" demonstrate how sustainability can

be reframed as an accessible choice. Additionally, technologies like blockchain and AI can enhance transparency and reduce waste, but their integration must align with consumer expectations for convenience and affordability.

6.2 Future Research Directions

Future research should extend beyond the current sample, which is mainly from Europe and North America, to include insights from regions such as South Asia and sub-Saharan Africa. This would provide a more comprehensive understanding of how cultural and economic factors influence sustainable fashion consumption.

Although this study focused on blockchain, future research could explore the effects of other emerging technologies, such as AI-driven personalisation, 3D virtual sampling and IoT-enabled garment tracking. These technologies have the potential to minimise overproduction and waste, but their adoption and consumer confidence require further testing.

Ultimately, longitudinal studies could monitor the evolution of consumer behaviour over time, especially as new generations gain purchasing power. Furthermore, merging self-reported data with behavioural metrics, such as records of actual purchases, could offer a more precise understanding of the gap between intentions and behaviour.

CONCLUSIONS

This dissertation investigates the transformative journey of the luxury fashion industry's transformative journey, balancing sustainability and digital innovation while maintaining its craftsmanship, heritage, and exclusivity. It focuses on understanding how digital technologies reshape business models, operational practices, and consumer relationships within this sector.

The first chapter reveals a shift in the academic discourse regarding the luxury fashion industry through the bibliometric analysis of 560 articles (1999–2024). Early studies focused on branding and status signalling (Kapferer & Bastien, 2012; Fionda & Moore, 2009), whereas recent themes highlight digital transformation (e.g., blockchain, AI) and sustainability (Choi, 2019; Zollo et al., 2020). Six clusters emerged, including consumer-centric branding, digital engagement, and sustainability, with understudied areas such as SME adaptation and Gen Z's redefinition of luxury.

The second chapter shows the importance of organisational adaptation. In fact, the case study of Dyloan Bond Factory, an Italian SME, highlighted the challenges and opportunities of digital transformation. It allowed the identification of the main enablers, which included strategic partnerships and digital literacy, and barriers, involving non-standardised IT systems and a slight resistance to change in some situations to a greater extent than others (Bertola & Teunissen, 2018; Cabigiosu, 2020). This case study showed how an SME has been capable of blending traditions (i.e., craftsmanship) with Industry 4.0 technologies such as additive manufacturing, laser cutting, and 3D prototyping (Stratasys, 2022).

The third chapter shifted the focus from the small reality of fashion SMEs to big conglomerates such as LVMH, Kering, Capri Holdings, and PVH. A text-mining analysis of sustainability reports from these luxury fashion brands uncovered a gap between symbolic disclosures and actionable metrics (Wells et al., 2021; Karaosman et al., 2015). While themes such as the circular economy and carbon neutrality dominated, technologies such as blockchain or IoT remained underutilised in aligning sustainability strategies with management control systems (MCSs) (Gazzola et al., 2024; Lu & Franco 2021). The EU Corporate Sustainability Reporting Directive (CSRD), validated in 2022 and effective from 2024, was recognised as a promoter for the standardisation of sustainability reports.

After analysing the current state of the luxury fashion industry from the perspective of small and medium-sized enterprises as well as holding companies, the fourth chapter aims to understand how consumers approach

the fashion industry. A survey of 383 consumers revealed a persistent "attitude-behaviour gap" (Carrington et al., 2014). Although Gen Z prioritised sustainability, affordability and style remained dominant in purchasing decisions (Mandarić et al., 2022). Blockchain adoption was viewed positively for enhancing transparency but had a limited direct effect on purchase intent, underscoring the necessity for consumer education and value alignment (Saberi et al., 2019; Garg et al., 2021).

As the luxury fashion industry lies at the intersection of tradition and innovation, this thesis emphasises the function of technology as a responsible growth factor rather than a disruptive one. By addressing the tensions between tradition and innovation, as well as exclusivity and transparency, the industry can create a future in which timeless craftsmanship coexists with sustainable responsibility. The results encourage a holistic approach. In today's dynamic landscape, the true value of luxury fashion lies not only in its preservation but also in its innovation. Digital tools enhance sustainability, SMEs thrive on adaptive strategies and consumer demands are seen as a driver for systemic change.

Table 1. Summary of Chapter Findings and Theoretical Contributions

Chapter	Level	Main Findings	Theoretical Contribution
Chapter 1	***Macro*** Academic trends	Shift in research from branding/status to digital and sustainability	Confirms growing paradox discourse in literature; identifies underexplored areas (e.g., Gen Z, SMEs)
Chapter 2	***Meso*** SME strategy	SMEs can successfully adopt digital tools while preserving identity	Digitainability operationalised in small-scale luxury production
Chapter 3	***Meso*** MCS & sustainability	Reports emphasize ideals but lack tech-enabled accountability	Highlights role of tech (e.g., blockchain) in aligning MCSs with real sustainability
Chapter 4	***Micro*** Consumer behavior	Consumers value sustainability but prioritize affordability/style	Reveals attitude-behavior gap; tech trust doesn't fully drive purchase intent

Table 1 synthesises the dissertation's empirical findings and theoretical contributions across its four chapters, anchoring them within the macro-meso-micro levels. At the macro level (Chapter 1), the shift in academic discourse from branding to digital and sustainability themes underscores the growing scholarly engagement with paradoxes inherent to luxury fashion while exposing gaps in understanding Gen Z's influence and SME adaptation. The meso-level analyses—spanning SME strategy (Chapter 2) and conglomerate management control systems (Chapter 3)—reveal contrasting realities: SMEs exemplify how Digitainability can harmonise tradition with digital tools, whereas conglomerates' symbolic reporting highlights systemic failures to

operationalise technologies like blockchain for accountability. Finally, the micro-level (Chapter 4) uncovers the persistent consumer attitude-behaviour gap, where sustainability values clash with purchasing pragmatism, and trust in technologies like blockchain remains disconnected from purchase intent. Collectively, this table reinforces the framework's stratified structure, illustrating how tensions at each level—academic trends, organisational inertia, consumer contradictions—demand integrated solutions to reconcile heritage with innovation, exclusivity with transparency, and ethical intent with actionable change.

These findings collectively affirm the necessity of a multi-level, paradox-informed framework to navigate the luxury fashion industry's evolution amid digital and sustainability imperatives. As illustrated across the four chapters, tensions between tradition and innovation manifest uniquely at macro, meso, and micro levels: academic discourse shifts toward sustainability and technology (Chapter 1), SMEs balance heritage with digital tools (Chapter 2), conglomerates struggle to align symbolic disclosures with actionable tech-enabled metrics (Chapter 3), and consumers grapple with ethical intentions versus purchasing behaviours (Chapter 4). The integrated framework, visualized in Figure 1, encapsulates these dynamics, positioning firms, consumers, and policymakers as interdependent actors mediating paradoxical demands – exclusivity versus transparency, craftsmanship versus scalability, ethical rhetoric versus economic pragmatism. Technologies like blockchain and AI emerge as critical mediators, bridging gaps between legacy values and modern accountability. By grounding this framework in empirical insights – from SME adaptability to Gen Z's aspirational-consumption paradox – it offers a systemic model for harmonizing preservation and progress, ensuring that digital innovation amplifies, rather than undermines, the timeless essence of luxury.

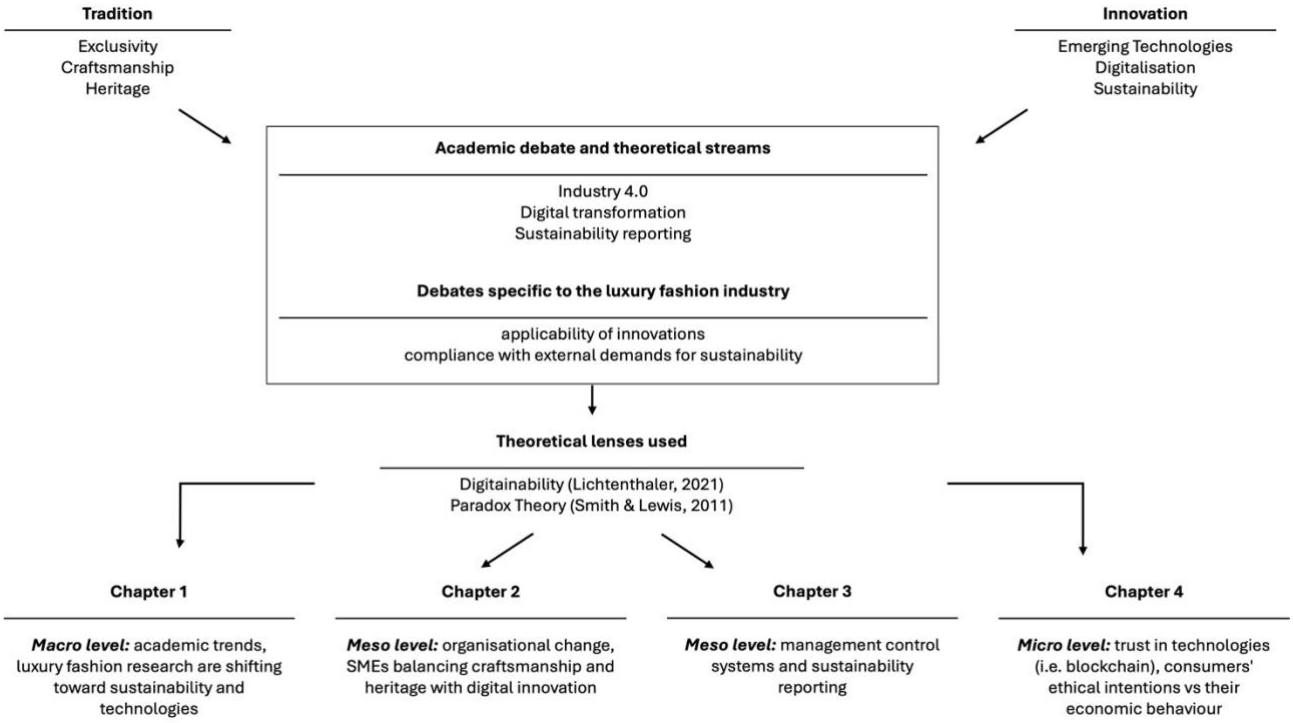


Figure 1. Multilevel framework for tradition–innovation tensions in the luxury fashion industry

The conceptual framework presented provides a lens to interpret these findings, interweaving the sector's distinctive tradition with its contemporary challenges.

At its core, the framework emphasises the "paradoxical" interplay between exclusivity, craftsmanship, and heritage that characterises the luxury fashion industry and innovation, in the form of digitalisation and sustainability. This tension is vividly illustrated in the Dyloan Bond Factory case study (Chapter 2). Here, craftsmanship traditions such as hand-stitching coexist with Industry 4.0 technologies such as 3D prototyping and laser cutting, demonstrating that innovation may not necessarily eclipse tradition but can instead amplify its relevance. This duality is further contextualised by the integration of Digitainability (Lichtenthaler, 2021), a theoretical lens that highlights the interdependence between sustainability and digital tools. For example, while the potential of blockchain to improve traceability and combat greenwashing is well documented (Saberi et al., 2019), its low use in conglomerates' sustainability strategies (Chapter 3) reveals systemic hesitancy. Luxury conglomerates often prioritise symbolic disclosures, such as carbon neutrality commitments, thereby missing opportunities to align operational practices with circular economy claims.

The macro-meso-micro layering of the framework reflects the holistic scope of the dissertation, linking trends with local realities. At the macro level, regulatory changes such as the European Corporate

Sustainability Reporting Directive (CSRD) incentivise the standardisation of reporting, reflecting a broader academic and societal demand for transparency (Chapter 1). However, analyses at the meso-level - from the agile adaptation of SMEs (Chapter 2) to the symbolic disclosures of conglomerates (Chapter 3) - show persistent organisational misalignments.

For example, SMEs like Dyloan leverage strategic partnerships and digital literacy to harmonise assets with innovation, while conglomerates often rely on figurative narratives of sustainability, hindered by rigid legacy infrastructures and an aversion to disruptive change.

At the micro level, insights into consumers (Chapter 4) further obfuscate the picture. While Generation Z supports sustainability in theory, purchasing decisions remain tied to affordability and aesthetics, perpetuating an "attitude-behaviour gap" (Carrington et al., 2014). Blockchain, although acclaimed for transparency, struggles to bridge this gap, underscoring the need for consumer education and value-driven marketing to turn ethical intentions into actions.

By framing technology as a responsible growth factor, the framework supports solutions that respect tradition and amplify sustainability. For SMEs, like Dyloan Bond Factory, this means embracing adaptive strategies to differentiate themselves, such as merging craftsmanship with additive manufacturing. For conglomerates, it requires going beyond performative statements to operationalise technologies such as blockchain and IoT, ensuring that sustainability metrics are verifiable and aligned with standardised frameworks and directives. Policymakers, meanwhile, need to balance regulatory rigour with supporting SME compliance, recognising that standardised reporting, as required by CSRD, can only drive change if accompanied by resources to facilitate their implementation.

Ultimately, the framework highlights the central thesis: the survival of the luxury fashion industry is not contingent on the choice between heritage and innovation but on their harmonisation. This requires redefining exclusivity to include ethical transparency, reimagining craftsmanship through collaborative human-machine workflows and aligning consumer education with the aspirational values of younger generations, such as Generation Z.

Thereby, the framework serves both as a diagnostic tool - identifying resistance points such as organisational inertia and consumers' "attitude-behaviour gap" (Carrington et al., 2014) - and as a roadmap, supporting policies, partnerships and informative initiatives that reconcile tradition with innovation. Thus, the luxury

fashion industry could position itself not as a remnant of the past, but as a forerunner of a sustainable future in which timeless craftsmanship and cutting-edge innovation coexist symbiotically.

References (divided by chapters)

Chapter I

1. Achabou, M. A., & Dekhili, S. (2013). Luxury and sustainable development: Is there a match? Journal of Business Research, 66(10), 1896–1903. https://doi.org/10.1016/j.jbusres.2013.02.011
2. Basile, G., et al. (2024). (Reference not fully provided in the text)
3. Bhardwaj, V., & Fairhurst, A. (2010). Fast fashion: Response to changes in the fashion industry. The International Review of Retail, Distribution and Consumer Research, 20(1), 165–173. https://doi.org/10.1080/09593960903498300
4. Bocken, N. M. P., de Pauw, I., Bakker, C., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. Journal of Industrial and Production Engineering, 33(5), 308–320. https://doi.org/10.1080/21681015.2016.1172124
5. Brun, A., Caniato, F., Caridi, M., Castelli, C., Miragliotta, G., Ronchi, S., & Spina, G. (2008). Logistics and supply chain management in the luxury fashion retail: Empirical investigation of Italian firms. International Journal of Production Economics, 114(2), 554–570. https://doi.org/10.1016/j.ijpe.2007.06.012
6. Bruno, P., & Barki, E. (2014). The role of counterfeiting in the luxury industry: Consumer perception and managerial implications. Journal of Business Research, 67(12), 2727–2733. https://doi.org/10.1016/j.jbusres.2014.03.014
7. Burnasheva, R., Suh, Y. G., & Villalobos-Moron, A. (2019). The impact of sustainability on luxury fashion consumption. Journal of Business Research, 117, 256–267. https://doi.org/10.1016/j.jbusres.2020.05.001
8. Cabigiosu, A. (2020). Digitalization in the luxury fashion industry: Opportunities and challenges. Luxury: History, Culture, Consumption, 7(2), 95–110. https://doi.org/10.1080/20511817.2020.1820733
9. Cavusoglu, L., & Dakhli, M. (2016). The paradox of sustainable luxury fashion. Journal of Consumer Behaviour, 15(4), 252–264. https://doi.org/10.1002/cb.1554

10. Cervellon, M.-C., Carey, L., & Harms, T. (2012). Something old, something used: Determinants of women's purchase of vintage fashion vs. second-hand fashion. International Journal of Retail and Distribution Management, 40(12), 956–974. https://doi.org/10.1108/09590551211274946
11. Choi, T.-M. (2014). Fast fashion systems: Theory and applications. CRC Press.
12. Choi, T.-M. (2019). Blockchain-technology-supported platforms for diamond authentication and certification in luxury supply chains. Transportation Research Part E: Logistics and Transportation Review, 128, 17–29. https://doi.org/10.1016/j.tre.2019.05.011
13. Chung, M., Ko, E., Joung, H., & Kim, S. J. (2020). Chatbot e-service and customer satisfaction regarding luxury brands. Journal of Business Research, 117, 587–595. https://doi.org/10.1016/j.jbusres.2018.10.004
14. Creevey, L., Holmes, A., & Holyoak, N. (2021). The impact of social media influencers on luxury fashion brands. Journal of Fashion Marketing and Management, 25(2), 299–316. https://doi.org/10.1108/JFMM-10-2020-0223
15. Djelic, M.-L., & Ainamo, A. (1999). The coevolution of new organizational forms in the fashion industry: A historical and comparative study of France, Italy, and the United States. Organization Science, 10(5), 622–637. https://doi.org/10.1287/orsc.10.5.622
16. Dobre, C., Milfelner, B., & Pelegrin-Borondo, J. (2021). The impact of luxury brands on consumer happiness. Journal of Retailing and Consumer Services, 59, 102358. https://doi.org/10.1016/j.jretconser.2020.102358
17. Fionda, A. M., & Moore, C. M. (2009). The anatomy of the luxury fashion brand. Journal of Brand Management, 16(5-6), 347–363. https://doi.org/10.1057/bm.2008.45
18. Fionda, A. M., & Moore, C. M. (2009). The anatomy of the luxury fashion brand. Journal of Brand Management, 16(5-6), 347–363. https://doi.org/10.1057/bm.2008.45
19. Fletcher, K. (2014). Sustainable fashion and textiles: Design journeys (2nd ed.). Routledge.
20. Gurzki, H., & Woisetschläger, D. M. (2017). Mapping the luxury research landscape: A bibliometric citation analysis. Journal of Business Research, 75, 134–149. https://doi.org/10.1016/j.jbusres.2017.02.005
21. Guzzetti, L., et al. (2024). (Reference not fully provided in the text)

22. Heine, K. (2010). The personality of luxury fashion brands. Journal of Brand Management, 17(6), 487–506. https://doi.org/10.1057/bm.2010.4
23. Hennigs, N., Wiedmann, K.-P., Klarmann, C., Strehlau, S., & Godey, B. (2012). What is the value of luxury? Investigating consumer perceptions of luxury brand value across countries, Journal of Psychology & Marketing, 29(12), 1018–1034. https://doi.org/10.1002/mar.20583
24. Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic consumption: Emerging concepts, methods and propositions. Journal of Marketing, 46(3), 92–101. https://doi.org/10.1177/002224298204600314
25. Kapferer, J.-N. (2012). Abundant rarity: The key to luxury growth. Business Horizons, 55(5), 453–462. https://doi.org/10.1016/j.bushor.2012.04.002
26. Kapferer, J.-N. (2020). Why luxury should not delocalize: A theoretical framework for luxury offshoring decisions. Luxury: History, Culture, Consumption, 7(1), 78–96. https://doi.org/10.1080/20511817.2020.1723662
27. Kapferer, J.-N., & Bastien, V. (2009). The specificity of luxury management: Turning marketing upside down. Journal of Brand Management, 16(5-6), 311–322. https://doi.org/10.1057/bm.2008.51
28. Kapferer, J.-N., & Bastien, V. (2012). The luxury strategy: Break the rules of marketing to build luxury brands (2nd ed.). Kogan Page.
29. Kapferer, J.-N., & Michaut-Denizeau, A. (2020). The sustainability continuum in the luxury industry: From pioneering luxury to sustainable luxury to responsible luxury. Journal of Brand Management, 27(1), 9–22. https://doi.org/10.1057/s41262-019-00165-6
30. Kim, A. J., & Ko, E. (2010). Impacts of luxury fashion brand's social media marketing on customer relationship and purchase intention. Journal of Global Fashion Marketing, 1(3), 164–171. https://doi.org/10.1080/20932685.2010.10593068
31. Kim, A. J., & Ko, E. (2012). Do social media marketing activities enhance customer equity? An empirical study of luxury fashion brands. Journal of Business Research, 65(10), 1480–1486. https://doi.org/10.1016/j.jbusres.2011.10.014
32. Ko, E., Costello, J. P., & Taylor, C. R. (2017). What is a luxury brand? A new definition and review of the literature. Journal of Business Research, 70, 405–413. https://doi.org/10.1016/j.jbusres.2016.08.002

33. Li, G., Li, G., & Kambele, Z. (2012). Luxury fashion brand consumers in China: Perceived value, fashion lifestyle, and willingness to pay. Journal of Business Research, 65(10), 1516–1522. https://doi.org/10.1016/j.jbusres.2011.10.019
34. Liu, F., Li, J., Mizerski, D., & Soh, H. (2012). Self-congruity, brand attitude, and brand loyalty: A study on luxury brands. European Journal of Marketing, 46(7/8), 922–937. https://doi.org/10.1108/03090561211230098
35. Lyon, T. P., & Montgomery, A. W. (2015). The means and end of greenwash. Organization & Environment, 28(2), 223–249. https://doi.org/10.1177/1086026615575332
36. McDonough, W., & Braungart, M. (2002). Cradle to cradle: Remaking the way we make things. North Point Press.
37. Moore, C. M., Fernie, J., & Burt, S. (2010). Brands without boundaries: The internationalisation of the designer retailer's brand. European Journal of Marketing, 44(11/12), 1856–1872. https://doi.org/10.1108/03090561011079912
38. Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T., & Gwilt, A. (2020). The environmental price of fast fashion. Nature Reviews Earth & Environment, 1(4), 189–200. https://doi.org/10.1038/s43017-020-0039-9
39. Park, H.-J., Rabolt, N. J., & Jeon, S. (2008). Purchasing global luxury brands among young Korean consumers. Journal of Fashion Marketing and Management, 12(2), 244–259. https://doi.org/10.1108/13612020810874917
40. Park, H.-J., Rabolt, N. J., & Sook, K. J. (2018). Purchasing global luxury brands among young Korean consumers. Journal of Fashion Marketing and Management, 12(2), 244–259. https://doi.org/10.1108/13612020810874917
41. Rathi, S., Chandran, A., & Bhattacharya, S. (2022). The evolution of luxury branding research: A systematic review and bibliometric analysis. Journal of Business Research, 139, 1105–1120. https://doi.org/10.1016/j.jbusres.2021.10.029
42. Turunen, L. L. M., Cervellon, M. C., & Carey, L. (2020). Sustainability and second-hand fashion consumption: A cross-cultural study. International Journal of Retail & Distribution Management, 48(12), 1285–1303. https://doi.org/10.1108/IJRDM-03-2019-0096

43. Vanacker, T., Verdin, P., & De Beule, F. (2022). Sustainability strategies in the luxury fashion industry. Journal of Business Ethics, 175(4), 789–805. https://doi.org/10.1007/s10551-021-04972-8
44. Veblen, T. (1899). The theory of the leisure class: An economic study of institutions. Macmillan.
45. Venkatesh, A., Sherry, J. F., & Firat, A. F. (2010). The epistemology of consumer culture theory. Journal of Consumer Research, 46(4), 582–589. https://doi.org/10.1093/jcr/ucy046
46. Vigneron, F., & Johnson, L. W. (2004). Measuring perceptions of brand luxury. Journal of Brand Management, 11(6), 484–506. https://doi.org/10.1057/palgrave.bm.2540194
47. Vogel, V., Evanschitzky, H., & Ramaseshan, B. (2018). Customer equity drivers and future sales. Journal of Marketing, 72(6), 98–108. https://doi.org/10.1509/jmkg.72.6.98
48. Wiedmann, K.-P., & von Mettenheim, W. (2020). Attractiveness, trustworthiness, and expertise – Social influencers' winning formula? Journal of Product and Brand Management, 29(7), 927–939. https://doi.org/10.1108/JPBM-06-2019-2442
49. Wu, J. (2015). Consumer perceptions of authenticity in luxury fashion. Journal of Retailing and Consumer Services, 22, 1–8. https://doi.org/10.1016/j.jretconser.2014.10.002
50. Yang, S., Han, J., & Lee, P. (2017). The role of sustainability in luxury fashion branding. Fashion and Textiles, 4(1), 3. https://doi.org/10.1186/s40691-017-0095-9
51. Yoo, B., & Lee, S. H. (2009). Counterfeit luxury brand consumption: A cross-cultural comparison of Korean and American consumers. Journal of International Consumer Marketing, 21(1), 1–16. https://doi.org/10.1080/08961530802125481
52. Yoon, S., Kim, J., & Lee, S. (2020). Sustainable fashion consumption: Exploring anti-consumption motivations. Journal of Business Research, 117, 321–332. https://doi.org/10.1016/j.jbusres.2020.05.012
53. Za, S., & Braccini, A. M. (2017). Digital transformation in fashion retail: Bibliometric analysis and research agenda. Journal of Business Research, 123, 341–354. https://doi.org/10.1016/j.jbusres.2020.08.017
54. Zhang, B., & Kim, J.-H. (2013). Luxury fashion consumption in China: Factors affecting attitude and purchase intent. Journal of Retailing and Consumer Services, 20(1), 68–79. https://doi.org/10.1016/j.jretconser.2012.10.007

55. Zollo, L., Filieri, R., Rialti, R., & Yoon, S. (2020). Unpacking the relationship between social media marketing and brand equity: The mediating role of consumers' benefits and experience. Journal of Business Research, 117, 256–267. https://doi.org/10.1016/j.jbusres.2020.05.001
56. Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. Organizational Research Methods, 18(3), 429–472. https://doi.org/10.1177/1094428114562629

Chapter II

1. Achille, A., Zipser, D.: A perspective for the luxury-goods industry during — and after — coronavirus. McKinsey Co. 1–6 (2020).
2. Aiolfi, S., Sabbadin, E.: Fashion and New Luxury Digital Disruption: The New Challenges of Fashion between Omnichannel and Traditional Retailing. Int. J. Bus. Manag. 14, 41 (2019). https://doi.org/10.5539/ijbm.v14n8p41.
3. Alsaawi, A.: A critical review of qualitative interviews. Eur. J. Bus. Soc. Sci. 3, 149–156 (2014). https://doi.org/10.1093/applin/amq043.
4. Amed, I., André, S., Berg, A., Devillard, S., Balchandani, A., Straub, M., Rolkens, F., Kersnar, J., Grunberg, J., Crump, H.: The State of Fashion 2023. (2023).
5. Andersson, J., Berg, A., Hedrich, S., Magnus, K.-H.: Is apparel manufacturing coming home? (2018).
6. Barney, J.: Firm Resources and Sustained Competitive Advantage. J. Manage. 17, 99–120 (1991). https://doi.org/10.1177/014920639101700108.
7. Bassano, C., Barle, S., Saviano, M.L., Cosimato, S., Pietronudo, M.C.: AI technologies & value co-creation in a luxury goods context. Proc. Annu. Hawaii Int. Conf. Syst. Sci. 2020-January, 1618–1627 (2020).
8. Belardinelli, R.: Da Valentino a Vuitton, la moda va nel metaverso, (2021).
9. Bertola, P., Teunissen, J.: Fashion 4.0. Innovating fashion industry through digital transformation. Res. J. Text. Appar. 22, 352–369 (2018). https://doi.org/10.1108/RJTA-03-2018-0023.
10. Bindi, B., Bandinelli, R., Fani, V., Pero, M.E.P.: Supply chain strategy in the luxury fashion industry: impacts on performance indicators. Int. J. Product. Perform. Manag. (2021). https://doi.org/10.1108/IJPPM-02-2021-0079.
11. Bingol, V.: Gucci Case Study: How NFTs are Revolutionizing the Fashion Industry, (2021).

12. Birkel, H.S., Veile, J.W., Müller, J.M., Hartmann, E., Voigt, K.I.: Development of a risk framework for Industry 4.0 in the context of sustainability for established manufacturers. Sustain. 11, 1–27 (2019). https://doi.org/10.3390/su11020384.
13. Braglia, M., Marrazzini, L., Padellini, L., Rinaldi, R.: Managerial and Industry 4.0 solutions for fashion supply chains. J. Fash. Mark. Manag. 25, 184–201 (2021). https://doi.org/10.1108/JFMM-12-2019-0285.
14. Cabigiosu, A.: Digitalization in the Luxury Fashion Industry Strategic Branding for Millennial Consumers. Springer International Publishing (2020).
15. Caldarelli, G., Zardini, A., Rossignoli, C.: Blockchain adoption in the fashion sustainable supply chain: Pragmatically addressing barriers. J. Organ. Chang. Manag. 34, 507–524 (2021). https://doi.org/10.1108/JOCM-09-2020-0299.
16. Casalino, N., Ciarlo, M., De Marco, M., Gatti, M.: ICT adoption and organizational change an innovative training system on industrial automation systems for enhancing competitiveness of SMEs. ICEIS 2012 - Proc. 14th Int. Conf. Enterp. Inf. Syst. 2 ISAS, 283–288 (2012). https://doi.org/10.5220/0004116002830288.
17. Chanias, S.: Mastering Digital Transformation: The Path of a Financial Services Provider Towards a Digital Transformation Strategy. Proc. Proceeding 25th Eur. Conf. Inf. Syst. 2017, (2017).
18. Confindustria Chieti Pescara: La trasformazione digitale nelle PMI italiane: contesto attuale, prospettive ed esperienze, (2022).
19. Corbetta, P.: Metodologia e tecniche della ricerca sociale. Il Mulino (1999).
20. Cosenza, V.: Social Media ROI. Apogeo, Milano (2014).
21. Creswell, J.W.: Qualitative inquiry and research design : choosing among five approaches. SAGE Publications Ltd (2013).
22. Dakhnovich, A., Moskvin, D., Zeghzda, D.: An approach for providing industrial control system sustainability in the age of digital transformation. IOP Conf. Ser. Mater. Sci. Eng. 497, (2019). https://doi.org/10.1088/1757-899X/497/1/012006.
23. De Rose, C.: Che cos'è la ricerca sociale. Carocci Editore, Roma (2003).

24. Deloitte: Industry 4.0. Challenges and solutions for the digital transformation and use of exponential technologies. Deloitte. 1–30 (2015).
25. Drath, R., Horch, A.: Industrie 4.0: Hit or hype? [Industry Forum]. IEEE Ind. Electron. Mag. 8, 56–58 (2014). https://doi.org/10.1109/MIE.2014.2312079.
26. Finn, A.: Luxury fashion: The role of innovation as a key contributing factor in the development of luxury fashion goods and sustainable fashion design. In: Conference Proceedings 2011 Fashion and Luxury: Between Heritage and Innovation. pp. 11–17. Institut Francais de la Mode (2011).
27. Fondazione Symbola: Circolarità per competere, (2022).
28. Furr, N., Gaarlandt, J., Shipilov, A.: Don't Put a Digital Expert in Charge of Your Digital Transformation. Harv. Bus. Rev. (2019).
29. Gilchrist, A.: Industry 4.0 The Industrial Internet of Things. Apress, Berkeley, CA (2016). https://doi.org/10.1007/978-1-4842-2047-4.
30. Godart, F., Seong, S.: Is sustainable luxury fashion possible. Sustain. Lux. Manag. Soc. Environ. Perform. Iconic Brand. 12–27 (2017). https://doi.org/10.4324/9781351287807-2.
31. Gong, C., Ribiere, V.: Developing a unified definition of digital transformation. Technovation. 102, 102217 (2021). https://doi.org/10.1016/j.technovation.2020.102217.
32. Harba, J.-N.: New approaches to customer experience: where disruptive technological innovation meets luxury fashion. Proc. Int. Conf. Bus. Excell. 13, 740–758 (2019). https://doi.org/10.2478/picbe-2019-0066.
33. Hastig, G.M., Sodhi, M.M.S.: Blockchain for Supply Chain Traceability: Business Requirements and Critical Success Factors. Prod. Oper. Manag. 29, 935–954 (2020). https://doi.org/10.1111/poms.13147.
34. Hermann, M., Pentek, T., Otto, B.: Design Principles for Industrie 4.0 Scenarios: A Literature Review. Tech. Univ. Dortmund. 1, 4–16 (2015). https://doi.org/10.13140/RG.2.2.29269.22248.
35. Hollander, R.: Sustained competitive advantage using Industry 4.0 technologies. 17–7 (2018).
36. Hoskins, T.: Reliving the Rana Plaza factory collapse: a history of cities in 50 buildings, day 22, (2015).
37. Jana, R.: Moda e pellicce: fine di una storia d'amore?, (2020).

38. Janowski, T.: Digital government evolution: From transformation to contextualization. Gov. Inf. Q. 32, 221–236 (2015). https://doi.org/10.1016/j.giq.2015.07.001.
39. Joy, A., Sherry, J.F., Venkatesh, A., Wang, J., Chan, R.: Fast fashion, sustainability, and the ethical appeal of luxury brands. Fash. Theory - J. Dress Body Cult. 16, 273–295 (2012). https://doi.org/10.2752/175174112X13340749707123.
40. Jung, J., Yu, J., Seo, Y., Ko, E.: Consumer experiences of virtual reality: Insights from VR luxury brand fashion shows. J. Bus. Res. 130, 517–524 (2021). https://doi.org/10.1016/j.jbusres.2019.10.038.
41. Kagermann, H., Lukas, W.-D., Wahlster, W.: Industrie 4.0: Mit dem Internet der Dinge auf dem Weg zur 4. industriellen Revolution. VDI Nachrichten. 3–4 (2011).
42. Kagermann, H., Wahlster, W., Helbig, J.: Recommendations for implementing the strategic initiative INDUSTRIE 4.0 , Final Report of the Industrie 4.0 Working Group. , Frankfurt, Germany (2013).
43. Kagermann, H.: Chancen von Industrie 4.0 ,. In: T., B., Hompel, M. ten, and Vogel-Heuser, B. (eds.) Industrie 4.0 in Produktion, Automatisierung und Logistik: Anwendung, Technologien und Migration. pp. 603–614 (2014).
44. Lawry, C.A.: Blurring luxury: the mediating role of self-gifting in consumer acceptance of phygital shopping experiences. Int. J. Advert. 41, 796–822 (2022). https://doi.org/10.1080/02650487.2021.1903742.
45. Loebbecke, C., Picot, A.: Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. J. Strateg. Inf. Syst. 24, 149–157 (2015). https://doi.org/10.1016/j.jsis.2015.08.002.
46. LYST Insights: The 2020 Conscious Fashion Report. (2020).
47. Magni, A., Noè, C.: Innovazione e sostenibilità nell'industria tessile. (2017).
48. McDowell, M., Shoaib, M.: Louis Vuitton to release new NFTs, https://www.voguebusiness.com/technology/louis-vuitton-to-release-new-nfts, (2022).
49. McDowell, M.: Gucci goes deeper into the metaverse for the next NFT project, https://www.voguebusiness.com/technology/gucci-goes-deeper-into-the-metaverse-for-next-nft-project, (2022).

50. Morakanyane, R., Grace, A., O'Reilly, P.: Conceptualizing Digital Transformation in Business Organizations: A Systematic Review of Literature. In: Digital Transformation – From Connecting Things to Transforming Our Lives. pp. 427–443. University of Maribor Press (2017). https://doi.org/10.18690/978-961-286-043-1.30.
51. Mosca, F., La Rosa, E.: 4.0 Technology Within Fashion and Luxury Production. Symphonya. Emerg. Issues Manag. 82 (2019). https://doi.org/10.4468/2019.2.08mosca.larosa.
52. Park, S.M., Kim, Y.G.: A Metaverse: Taxonomy, Components, Applications, and Open Challenges. IEEE Access. 10, 4209–4251 (2022). https://doi.org/10.1109/ACCESS.2021.3140175.
53. Patel, K., McCarthy, M.P.: Digital Transformation: The Essentials of E-business Leadership. (2000).
54. Patton, M.Q.: Qualitative Research and Evaluation Methods. Sage Publications (2002).
55. Rupeika-Apoga, R., Petrovska, K.: Barriers to Sustainable Digital Transformation in Micro-, Small-, and Medium-Sized Enterprises. Sustain. 14, (2022). https://doi.org/10.3390/su142013558.
56. Salesforce, SDA Bocconi, Camera Nazionale della Moda Italiana: How to engage the customers of tomorrow. (2020).
57. Sanlorenzo, L., Schena, F., Vitali, G.: Piccole e Medie Imprese tessili. Il trasferimento tecnologico alla base delle strategie di crescita. Camera di Commer. Ind. Artig. e Agric. - Torino. (2009).
58. Schwab, K.: The Fourth Industrial Revolution. Portfolio (2017).
59. Silva, S.C., Duarte, P., Sundetova, A.: Multichannel versus omnichannel: a price-segmented comparison from the fashion industry. Int. J. Retail Distrib. Manag. 48, 417–430 (2020). https://doi.org/10.1108/IJRDM-07-2019-0232.
60. Smith, M.: Research Methods in Accounting. SAGE Publications Ltd (2019).
61. Stjepanovič, Z., Pilar, T., Rudolf, A., Jevšnik, S.: 3D virtual prototyping of clothing products. In: Bartkowiak, G. (ed.) Innovations in clothing technology & measurement techniques. pp. 28–41. Technical University of Lodz Press (2012).
62. Stratasys: Stratasys and Dyloan – taking fashion design into the future, (2022).
63. Subramaniam, M., Iyer, B., Venkatraman, V.: Competing in digital ecosystems. Bus. Horiz. 62, 83–94 (2019). https://doi.org/10.1016/j.bushor.2018.08.013.

64. Venier, F.: Trasformazione digitale e capacità organizzativa. Le aziende italiane e la sfida del cambiamento. EUT Edizioni Università di Trieste, Trieste (2017).
65. Westerman, G., Bonnet, D.: Revamping your business through digital transformation. MIT Sloan Manag. Rev. 56, 2–5 (2015).
66. Yin, R.K.: Case study research and applications: Design and methods. (2018). https://doi.org/10.1177/109634809702100108.
67. Yin, R.K.: Case study research: Design and methods. Sage Publications, Thousand Oaks, CA (2009).
68. Yin, R.K.: Mixed methods research: Are the methods genuinely integrated or merely parallel? Res. Sch. 13, 41–47 (2006).

Chapter 3

1. Aguilera, R. V., Rupp, D. E., Williams, C. A., & Ganapathi, J. (2007). Putting the S back in corporate social responsibility: A multilevel theory of social change in organizations. Academy of Management Review, 32(3), 836-863.
2. Akrout, H., & Guercini, S. (2022). Sustainability in fashion and luxury marketing: Results, paradoxes and potentialities. Journal of Global Fashion Marketing, 13(2), 91-100. https://doi.org/10.1080/20932685.2021.2017320
3. Amankwah-Amoah, J. (2016). Global business and emerging economies: Towards a new perspective. International Journal of Emerging Markets, 11(4), 457–474. https://doi.org/10.1108/IJoEM-01-2016-0015
4. Bansal, P., & Roth, K. (2000). Why companies go green: A model of ecological responsiveness. Academy of Management Journal, 43(4), 717–736. https://doi.org/10.2307/1556363
5. Bebbington, J., & Gray, R. (2001). An account of sustainability: Failure, success and a reconceptualization. Critical Perspectives on Accounting, 12(5), 557–587. https://doi.org/10.1006/cpac.2000.0453
6. Bertola, P., & Teunissen, J. (2018). Fashion 4.0: Innovating fashion industry through digital transformation. Research Journal of Textile and Apparel, 22(4), 352–369. https://doi.org/10.1108/RJTA-03-2018-0023

7. Campos Franco, J., Hussain, D., & McColl, R. (2019). Luxury fashion and sustainability: Looking good together. Journal of Business Strategy, 41(4), 55–61. https://doi.org/10.1108/JBS-05-2019-0089
8. Carter, C. R., & Rogers, D. S. (2008). A framework of sustainable supply chain management: Moving toward new theory. International Journal of Physical Distribution & Logistics Management, 38(5), 360–387. https://doi.org/10.1108/09600030810882816
9. Crane, A., & Matten, D. (2016). Business ethics: Managing corporate citizenship and sustainability in the age of globalization. Oxford University Press.
10. D'Onza, G. (2022). The evolving role of control systems in sustainability: An integrated approach. Management Control, 33(3), 5–24.
11. Della Porta, S., Paolini, D., & Fiorentino, R. (2023). Strategic control systems and sustainability in the luxury fashion industry. Sustainability Accounting, Management and Policy Journal. https://doi.org/10.1108/SAMPJ-03-2023-0094
12. Di Leo, G., Marino, M., & Morelli, C. (2023). Sustainability and luxury: A comparative analysis of sustainability reports in the fashion industry. Journal of Business Ethics, 167(3), 585–603. https://doi.org/10.1007/s10551-023-04901-6
13. Elkington, J. (1997). Cannibals with forks: The triple bottom line of 21st-century business. New Society Publishers.
14. Epstein, M. J., & Roy, M.-J. (2001). Sustainability in action: Identifying and measuring the key performance drivers. Long Range Planning, 34(5), 585–604. https://doi.org/10.1016/S0024-6301(01)00080-1
15. Fiorentino, R., De Marco, A., & Zamparelli, L. (2016). The role of sustainability in the evolution of management control systems. Journal of Cleaner Production, 133(3), 284–298. https://doi.org/10.1016/j.jclepro.2016.05.121
16. Gibassier, D., & Alcouffe, S. (2018). Environmental management accounting and innovation: Exploring the link between sustainability and accounting practices. Management Accounting Research, 39(2), 1–12. https://doi.org/10.1016/j.mar.2018.05.001

17. Gold, S., Seuring, S., & Beske, P. (2010). Sustainable supply chain management and inter-organizational resources: A literature review. Corporate Social Responsibility and Environmental Management, 17(4), 230–245. https://doi.org/10.1002/csr.207
18. Gond, J., Grubnic, S., Herzig, C., & Moon, J. (2012). Configuring management control systems: Theorizing the integration of sustainability within MCSs. Management Accounting Research, 23(3), 205–223. https://doi.org/10.1016/j.mar.2012.06.006
19. Karaosman, H., Morales-Alonso, G., & Grijalvo, M. (2015). Sustainable supply chain management in luxury fashion: A qualitative study of the three leading brands. Journal of Fashion Marketing and Management, 19(4), 416–433. https://doi.org/10.1108/JFMM-07-2013-0091
20. Lu, L., & Franco, M. (2021). Blockchain for sustainability reporting: Insights from the fashion industry. Journal of Sustainable Fashion and Textiles, 2(2), 123–140. https://doi.org/10.1080/27507232.2021.1873272
21. Mok, K., Bennett, T., & Houghton, M. (2022). Fashion and sustainability: Bridging the gap between luxury and the environment. Journal of Fashion Marketing and Management, 26(1), 45–62. https://doi.org/10.1108/JFMM-03-2021-0042
22. Narula, R. (2019). Enforcing social responsibility in supply chains in developing countries: The role of emerging-market multinationals and global value chains. Journal of World Business, 54(1), 18–25. https://doi.org/10.1016/j.jwb.2018.05.001
23. Oguntegbe, O., Andoh-Baidoo, F. K., & Awotunde, J. B. (2022). Exploring the role of blockchain technology in enhancing supply chain transparency and accountability: A systematic review. Technology in Society, 70, 101994. https://doi.org/10.1016/j.techsoc.2022.101994
24. Porter, M. E., & Kramer, M. R. (2011). Creating shared value. Harvard Business Review, 89(1/2), 62–77.
25. Schaltegger, S., & Burritt, R. (2010). Sustainability accounting for companies: Catchphrase or decision support for business leaders? Journal of World Business, 45(4), 375–384. https://doi.org/10.1016/j.jwb.2009.08.003

26. Schaltegger, S., & Wagner, M. (2006). Managing and measuring the business case for sustainability: Capturing the relationship between sustainability performance, business competitiveness and economic performance. International Journal of Business Strategy, 7(2), 24–35.
27. Seuring, S., & Müller, M. (2008). From a literature review to a conceptual framework for sustainable supply chain management. Journal of Cleaner Production, 16(15), 1699–1710. https://doi.org/10.1016/j.jclepro.2008.04.020
28. Sullivan, R., & Gouldson, A. (2012). Managing the climate impacts of the luxury goods industry: A global perspective. Global Environmental Change, 22(2), 412–421. https://doi.org/10.1016/j.gloenvcha.2012.01.009
29. Valentinetti, D., & Rea, A. (2023). Artificial Intelligence and sustainability reporting: Challenges and opportunities for the luxury fashion industry. Journal of Corporate Finance, 74(3), 101814. https://doi.org/10.1016/j.jcorpfin.2022.101814
30. Yadav, M. S., & Pathak, V. (2017). Text mining and its applications in sustainability research: A review. Journal of Sustainable Development, 10(2), 147–159.
31. Zhao, X., & Priporas, C. V. (2017). Sustainability and luxury: A study of consumers' perceptions in the Chinese fashion industry. International Journal of Retail & Distribution Management, 45(10), 1075–1090. https://doi.org/10.1108/IJRDM-04-2016-0054

Chapter 4

1. Amatulli, C., De Angelis, M., Korschun, D., & Romani, S. (2021). Omnichannel retailing in luxury fashion: Challenges and opportunities. *Journal of Retailing and Consumer Services, 61*, 102595. https://doi.org/10.1016/j.jretconser.2021.102595
2. Balakrishnan, J., & Dwivedi, Y. K. (2021). Conversational commerce: Entering the next stage of AI-powered digital assistants. *Annals of Operations Research*. https://doi.org/10.1007/s10479-021-04049-5
3. Barnes, L., & Lea-Greenwood, G. (2006). Fast fashioning the supply chain: Shaping the research agenda. *Journal of Fashion Marketing and Management, 10*(3), 259-271. https://doi.org/10.1108/13612020610679259

4. Bhardwaj, V., & Fairhurst, A. (2010). Fast fashion: Response to changes in the fashion industry. *The International Review of Retail, Distribution and Consumer Research, 20*(1), 165–173. https://doi.org/10.1080/09593960903498300
5. Biernacki, P., & Waldorf, D. (1981). Snowball sampling: Problems and techniques of chain referral sampling. *Sociological Methods & Research, 10*(2), 141-163. https://doi.org/10.1177/004912418101000205
6. Bowen, S. A. (2013). Using classic social media cases to distill ethical guidelines for digital engagement. *Journal of Mass Media Ethics, 28*(2), 119-133. https://doi.org/10.1080/08900523.2013.793523
7. Carrington, M. J., Neville, B. A., & Whitwell, G. J. (2014). Lost in translation: Exploring corporate social responsibility's consumer accountability gap. *Journal of Business Research, 67*(1), 85–93. https://doi.org/10.1016/j.jbusres.2013.03.004
8. Cavender, R., & Hellebrandt, L. (2020). Luxury fashion brands and corporate social responsibility: A multi-perspective analysis. *Journal of Fashion Marketing and Management, 24*(1), 15-30. https://doi.org/10.1108/JFMM-10-2018-0128
9. Choi, T. M., & Shen, B. (2017). *Luxury fashion retail management*. Springer.
10. Crewe, L. (2017). The geographies of fashion: Consumption, space, and value. *Bloomsbury Publishing.*
11. Djafarova, E., & Bowes, T. (2021). 'Instagram made me buy it': Generation Z impulse purchases in fashion industry. *Journal of Retailing and Consumer Services, 59*, 102345. https://doi.org/10.1016/j.jretconser.2020.102345
12. Duan, Y., Edwards, J. S., & Dwivedi, Y. K. (2019). Artificial intelligence for decision making in the fashion industry. *Journal of Business Research, 95*, 262-273. https://doi.org/10.1016/j.jbusres.2018.10.009
13. European Commission. (2022). *Digital Product Passport initiative: Sustainable product policy framework*. Retrieved from https://ec.europa.eu
14. Fashion United. (2023). The fashion industry and its economic impact. *Fashion United*. Retrieved from https://fashionunited.com

15. Ferraro, C., Sands, S., & Brace-Govan, J. (2016). The role of fashionability in second-hand shopping motivations. *Journal of Retailing and Consumer Services, 32*, 262–268. https://doi.org/10.1016/j.jretconser.2016.07.006
16. Festinger, L. (1957). *A theory of cognitive dissonance.* Stanford University Press.
17. Fong, C. M., Li, L., & Wang, C. (2022). Influencer marketing and fast fashion: The impact of TikTok on consumer behavior. *Journal of Consumer Culture, 22*(1), 1-18. https://doi.org/10.1177/14695405221109876
18. Garg, P., Gupta, B., Chauhan, A. K., Sivarajah, U., & Gupta, S. (2021). Measuring the perceived benefits of implementing blockchain technology in the banking sector. *Technological Forecasting and Social Change, 163*, 120479. https://doi.org/10.1016/j.techfore.2020.120479
19. Gwozdz, W., Nielsen, K. S., & Müller, T. (2017). An environmental perspective on clothing consumption: Consumer segments and their behavioral patterns. *Sustainability, 9*(5), 762. https://doi.org/10.3390/su9050762
20. Harvard Business Review. (2023). Shein: An ultra-fast fashion retailer's digital strategies (Case Study HK1378). *Harvard Business Publishing.* https://store.hbr.org/product/shein-an-ultra-fast-fashion-retailer-s-digital-strategies/HK1378
21. Hwang, Y., & Zhang, Q. (2018). Influence of social media on consumers' attitudes toward fast fashion. *Fashion and Textiles, 5*(1), 1-17. https://doi.org/10.1186/s40691-018-0130-6
22. Jackson, T., & Shaw, D. (2001). *Fashion marketing: Contemporary issues.* Palgrave Macmillan.
23. Jackson, T., & Shaw, D. (2009). *Mastering fashion marketing*. Palgrave Macmillan.
24. Javornik, A. (2016). Augmented reality: Research agenda for studying the impact of its media characteristics on consumer behavior. *Journal of Retailing and Consumer Services, 30*, 252–261. https://doi.org/10.1016/j.jretconser.2016.02.004
25. Jay, J. (2013). Navigating paradox as a mechanism of change and innovation in hybrid organizations. *Academy of Management Journal, 56*(1), 137-159. https://doi.org/10.5465/amj.2011.0751
26. Kapferer, J. N., & Bastien, V. (2012). *The luxury strategy: Break the rules of marketing to build luxury brands*. Kogan Page Publishers.

27. Kozar, J. M., & Hiller Connell, K. Y. (2013). Socially and environmentally responsible apparel consumption: Knowledge, attitudes, and behaviours. *Social Responsibility Journal, 9*(2), 316-325. https://doi.org/10.1108/SRJ-06-2011-0019
28. MacGregor Pelikánová, R., & Sani, A. (2023). Sustainable luxury fashion: A paradox or new reality? *Journal of Consumer Culture, 23*(2), 334-356. https://doi.org/10.1177/14695405221111392
29. Mandarić, D., Hunjet, A., & Vuković, D. (2022). The impact of fashion brand sustainability on consumer purchasing decisions. *Journal of Risk and Financial Management, 15*(4), 176. https://doi.org/10.3390/jrfm15040176
30. Moretto, A., & Macchion, L. (2022). Traceability in fashion supply chains: Blockchain as an enabler. *Supply Chain Management Review, 28*(3), 65-79.
31. New York State Senate. (2022). *Fashion Sustainability and Social Accountability Act (S7428)*. Retrieved from https://www.nysenate.gov
32. Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T., & Gwilt, A. (2020). The environmental price of fast fashion. *Nature Reviews Earth & Environment, 1*(4), 189-200. https://doi.org/10.1038/s43017-020-0039-9
33. Noonan, K., & Doran, J. (2022). Consumer trust and purchasing decisions in blockchain-enabled luxury fashion. *Journal of Consumer Research, 49*(1), 98-115. https://doi.org/10.1093/jcr/ucac062
34. Panju, S. (2024). Second-hand fashion and sustainability: A growing market. *Journal of Consumer Studies, 48*(1), 92-110.
35. Pantano, E., Priporas, C. V., & Dennis, C. (2017). Engaging consumer through the use of artificial intelligence and augmented reality in retail settings. *Journal of Retailing and Consumer Services, 38*, 88-97. https://doi.org/10.1016/j.jretconser.2017.03.003
36. Pencarelli, T., Škerháková, V., Valentiny, T., & Fedorko, R. (2019). Luxury products and sustainability issues from the perspective of young Italian consumers. *Sustainability, 12*, 245. https://doi.org/10.3390/su12010245
37. Pookulangara, S., & Shephard, A. (2013). Slow fashion movement: Understanding consumer perceptions. *Journal of Retailing and Consumer Services, 20*(2), 200-206. https://doi.org/10.1016/j.jretconser.2012.12.002

38. Poushneh, A., & Vasquez-Parraga, A. Z. (2017). Discernible impact of augmented reality on retail customer's experience, satisfaction, and willingness to buy. *Journal of Retailing and Consumer Services, 34*, 229–234. https://doi.org/10.1016/j.jretconser.2016.10.005
39. R Core Team. (2022). *R: A Language and environment for statistical computing (Version 4.1) [Computer software].* Retrieved from https://cran.r-project.org
40. Saberi, S., Kouhizadeh, M., Sarkis, J., & Shen, L. (2019). Blockchain technology and its relationships to sustainable supply chain management. *International Journal of Production Research, 57*(7), 2117-2135. https://doi.org/10.1080/00207543.2018.1533261
41. Sailer, A., Stöttinger, B., & Krämer, A. (2022). Greenwashing in the fashion industry: Consumers' perceptions and responses. *Journal of Business Ethics, 181*, 567–584. https://doi.org/10.1007/s10551-022-05156-9
42. Shen, B. (2014). Sustainable fashion supply chain: Lessons from H&M. *Supply Chain Management: An International Journal, 19*(6), 655–667. https://doi.org/10.1108/SCM-07-2013-0220
43. Singh, S., & Sahay, A. (2011). Consumer behavior in retail: A study of shopping experience across channels. *International Journal of Retail & Distribution Management, 39*(5), 328-349. https://doi.org/10.1108/09590551111128144
44. Smith, W. K., & Lewis, M. W. (2011). Toward a theory of paradox: A dynamic equilibrium model of organizing. *Academy of Management Review, 36*(2), 381–403. https://doi.org/10.5465/amr.2011.59330958
45. The jamovi project. (2023). *Jamovi (Version 2.4) [Computer Software].* Retrieved from https://www.jamovi.org
46. Turker, D., & Altuntas, C. (2014). Sustainable supply chain management in the fast fashion industry: An analysis of corporate reports. *European Management Journal, 32*(5), 837-849. https://doi.org/10.1016/j.emj.2014.02.003
47. United Nations Environment Programme (UNEP). (2023). The environmental cost of fashion: A global challenge. *UNEP Reports*. Retrieved from https://www.unep.org

48. Wang, Y., & He, Y. (2022). Sustainability strategies in the luxury fashion industry: A review of literature and future research agenda. *Journal of Fashion Marketing and Management, 26*(4), 585-602. https://doi.org/10.1108/JFMM-05-2021-0121
49. Wang, Y., He, Y., & Ma, S. (2019). Artificial intelligence in fashion: Applications and challenges. *Journal of Global Fashion Marketing, 10*(1), 1-17. https://doi.org/10.1080/20932685.2019.1575803
50. Wang, Y., Liu, Y., & Xu, G. (2020). Blockchain applications in the circular economy: Redefining sustainability in fashion. *Journal of Cleaner Production, 265*, 121778. https://doi.org/10.1016/j.jclepro.2020.121778
51. Wei, S., & Jung, J. (2017). Consumer attitudes toward sustainability and blockchain-based authentication in luxury fashion. *Journal of Consumer Studies, 41*(5), 890-910.
52. Wijaya, M., & Paramita, W. (2021). Consumer willingness to pay for sustainable luxury: The role of blockchain transparency. *International Journal of Fashion Studies, 14*(1), 45-67.
53. Yillehto, A., Sørensen, C., & Jensen, T. (2021). Digital transformation in fashion retailing: Customer experiences and omnichannel strategies. *Journal of Retailing and Consumer Services, 63*, 102635. https://doi.org/10.1016/j.jretconser.2021.102635
54. Yilmaz, V., & Temizkan, V. (2020). Exploring the role of blockchain in sustainable supply chains: A case study in the fashion industry. *Sustainability, 12*(24), 10568. https://doi.org/10.3390/su122410568

Appendix 1

Factor	Variable	Measurement items	Adapted from	Response format
Personal	Behaviour toward fashion purchases	In the last six months, which fashion category best represents your predominant shopping preference?	Fast fashion definition (Joy et al., 2012) Luxury definition (Wang, 2022)	**Single Response** • Fast fashion (i.e., low-cost clothing collections based on current, high-cost luxury fashion trends) • High street fashion (neither fast fashion nor luxury fashion) • Luxury fashion (i.e., expensive and exclusive products and brands that are differentiated from other offers based on their exquisite design and craftmanship, sensory appeal, and distinct socio-cultural narratives.) • None of the above
		In the last six months, how many fashion items have you bought?	(options adapted from) Gwozdz et al. (2017)	**Single response** • None • 1–4 • 5–9 • 10–15 • 16–20 • more than 20
		How long do you usually keep a fashion item before discarding (disposing) it?	Gwozdz et al. (2017) Original question with answers: How long do you usually keep the following clothing items before discarding (disposing) it?	**Single Response** • Less than 6 months • Less than a year • 1–2 years • 3–4 years • 5 years or more
		Please rate by importance the following aspects: Conspicuousness, Prestige Self-identity, Hedonic, Materialistic Usability, Quality, Uniqueness Price	Hennigs et al. (2012)	1 = Not at all important 7 = Extremely important

	Consumers engagement with fashion brands (i.e. social media)	Do you follow any fashion brand on social media?		Yes/No
		Have you ever made a purchase based on an advertisement from fashion brands on social media?		Yes/No
	General blockchain technology understanding	Blockchain technology will improve the transparency in the fashion supply chain.	Garg et al. (2021)	1 (strongly disagree) to 7 (strongly agree) This can be put before the purchase intention scale, and it should not include the video explaining blockchain to get a general understanding of the application of blockchain from respondents.
		Blockchain technology will increase the trust the consumer has toward a particular fashion brand.		
		Blockchain technology will increase data accuracy in terms of traceability of materials and products in the fashion industry.		
		Blockchain technology will reduce the risk of buying counterfeit products in the fashion industry.		
		Blockchain technology will automate actions and transactions between parties.		
	Purchase intention	If a fashion brand has adopted blockchain technology: I would like to purchase fashion items from that brand.	Balakrishnan and Dwivedi (2021) Original statements: I would like to purchase through digital assistants I would like to repeat my experience in digital assistants I will execute my	1 (strongly disagree) to 7 (strongly agree)
		I would like to repeat my experience in purchasing fashion items from that brand		

		I will execute my next purchase from that fashion brand because it uses blockchain technology to track its production process	next purchase through digital assistants I am inclined to purchase products through digital assistants	
		I am inclined to purchase fashion items from that brand		
	Shopping experience satisfaction	If the fashion brand you're buying products from has adopted blockchain technology, please rate to which extent you agree with the following statements. I would be entirely satisfied with using blockchain technology applications during my shopping experience.	Yilmaz, K. and Temizkan, V. (2020) Original statement: I am entirely satisfied with using mobile shopping applications. The benefits I get from mobile shopping applications exceed my expectations. Mobile shopping application usage is an ideal retail technology.	1 (strongly disagree) to 7 (strongly agree)
		The benefits I get from blockchain technology applications in my shopping experience would exceed my expectations.		
		Blockchain technology application usage is an ideal fashion retail technology.		
		Please rate by importance how much the following aspects influence your shopping experience in terms of fashion: Channel choice (physical store, e-commerce) Convenience Entertainment Social interactions	Ylilehto et al. (2021)	1 = Not at all important 7 = Extremely important
		How important is the balance of affordability and style		**Sliding scale** from Affordability to Style (scale from 1 to 10)

		in your decision to buy fashion products?		
		What is your preferred channel for buying fashion products?		**Single response** 1. Physical stores (department stores, flagship stores, retail, etc.) 2. E-commerce (online platforms) 3. Both
		In regard to your channel choice, please rate by importance the following aspects: Ambience (Illumination, Landscaping, Background music, Ambient odour, General hygiene, Temperature control) Physical infrastructure (Open space, Size of the mall, Parking space, Size of the atrium) Marketing focus (Promotional schemes, Tenant-mix, Mall façade, Promotional events) Convenience to shopper (Utilities, Lifts and escalators, Distance of mall from home) Safety and security (Safety from accidents, Safety while shopping, Security against acts of terror)	Singh and Sahay (2011)	This question should be shown only to those who answered with **physical stores** in the previous question. 1 = Not at all important 7 = Extremely important
		In regard to your channel choice, please rate by	Maditinos and Theodoridis (2010)	This question should be shown only to those who answered with **e-**

		importance the following aspects: Product information quality; User interface quality; Service information quality; Purchasing process convenience; Security perception; Product attractiveness; and User's participation.		**commerce** in the previous question. 1 = Not at all important 7 = Extremely important
	Consumer attitude toward sustainability practices in the fashion industry	The sustainability of fashion brands is not a factor in my decision to buy their clothing.	Mandaríc, Hunjet and Vukovíc (2022)	1 (strongly disagree) to 7 (strongly agree)
		Before buying an item of clothing, I search for information about the fashion brand's sustainability policies, practices, and reputation but this is not a key factor in my decision.		
		Fashion brands' sustainability policies have an impact on my decision to buy their clothing.		
		Sustainability is a marketing gimmick, and, in my opinion, it is not truly a part of the fashion brand's strategy.		
		I prefer to buy clothing from fashion brands that have a sustainable clothing line.		
Demographics	Age	What is your age?		18-24 25-34 35-44 45-54 55-64 Over 65
	Gender	What is your gender?		Female Male Prefer not to answer

	Country of residence	In which country do you currently reside?		
	Employment status	What is your employment status?		Employed Self-employed Student Retired
	Annual income	What is the most suitable category for indicating your annual income before taxes? (in pounds, euros, dollars, etc.)		